"Supermarket operation on an industrial level—that's the key to our growth," says James P. Raugh, vice president-general manager, H. K. Porter Company Inc.'s Refractories Div. To see how the firm puts this philosophy to work, see Page 78

STEEL

The

Metalworking Weekly

JULY 25, 1960

A PENTON PUBLICATION

Record Inventories, Price Fights Jar Steel Service Centers

Gas Turbines Bid for More Jobs

15 Ways to Get More from Your Automatic Screw Machines

Lead Combats Vibration, Noise

CONTENTS—TURN PAGE

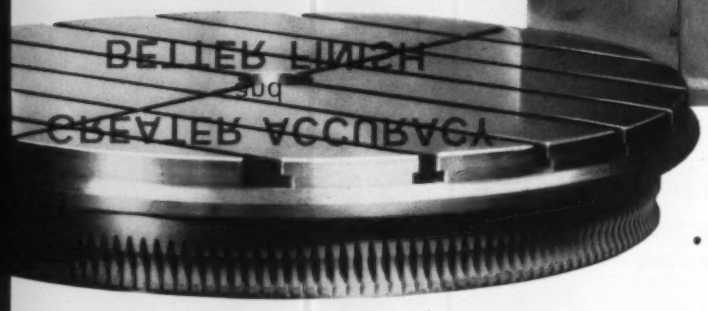
30" HEALD ROTARY

surface grinds

rotary index tables

with

GREATER ACCURACY
and
BETTER FINISH



. . . and up to five times faster, too!

On this Heald Model 361 30" Plain Rotary Surface Grinder, rotary indexing tables for other high-precision machine tools are ground flat and parallel within .0002", and to a surface finish of 15 micro-inches or better. Cast iron tables from 10 to 30 inches in diameter are easily handled, as well as a variety of miscellaneous parts.

Although high production was not a requirement, this Rotary enabled parts to be finished up to *five times faster* while obtaining greater accuracy and better finish than could be obtained with previous methods.

An adjustable wheel dresser built into the wheel-guard permits truing the wheel without resetting the wheelslide or moving the table. And a demagnetizing switch facilitates setup and unloading.

Heald offers a complete line of high-precision rotary surface grinding machines with chuck sizes from 6 to 30 inches and either manual or automatic reciprocation. Ask your Heald engineer for complete details, or send for a copy of Bulletin 2-361-1 Issue 2.

It PAYS to come to Heald

MMT-PE — Modern Machine Tools — Production Efficiency

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • Lansing • Milwaukee • New York • Philadelphia • Syracuse

HEALD ®

This Week in STEEL the Metalworking Weekly

July 25, 1960 Vol. 147 No. 4

Price Fights Jar Steel Distributors

The steel service centers are struggling to adjust their market to a highly competitive situation that has developed since last spring. Severe price cutting attending marginal distributors' efforts to unload heavy stocks and stimulate lagging demand has forced the lowering of published price schedules, but that has not stopped the price fighting. The centers are also bothered by: 1. Competition from mills with excess stocks. 2. Imports. PAGE 73

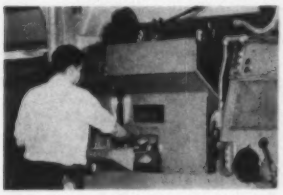
Gas Turbinemakers Broaden Markets

Although makers of gas turbines haven't cracked the passenger car market, they have broadened other markets, predicting turbines will become familiar power sources on the everyday scene. Why? Simple in design, compact in size, and efficient in operation at climatic extremes are a few reasons, say manufacturers. The industry is facing up to its problems, doing more consumer education, testing new metals. PAGE 75

Steel to Spend More for Auxiliary Equipment

Companies representing 58 per cent of U. S. steelmaking capacity will place orders for 2 per cent more capital equipment in the second half, 1960, than they did in the first half, a STEEL survey shows. Emphasis will be on nonsteelmaking equipment. PAGE 76

15 Ways to Get More from Automatics



One or more of the 15 suggestions made by Robert Beacom, engineer in charge of special attachments, National Acme Co., Cleveland, may be just what you are looking for to increase your production efficiency. Sketches are included to help you visualize many of the applications. PAGE 118

Spinning Head Inspects Total Rod Surface

Timken Roller Bearing Co., Canton, Ohio, is using a spinning head in a magnetic tester to completely eliminate bearing roller rejects resulting from surface flaws in the steel. It is called the Eddy Current Rototester, finds the surface flaws, and marks cold heading stock so that those sections can be discarded. PAGE 122

Shakes, Rattles, and Roars—Lead Loves Them

Interest in lead as an antisound and vibration control material is increasing. It is being prescribed as a remedy for shakes, rattles, thumps, roars, or knocks. Here's a look at the new use for an old metal and what it may mean to metalworking, both as an answer to a problem and as a possible idea for a new product. PAGE 149

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Index available semiannually.

STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

A fable for rabbits
(and others)

Once, deep in the forest, there lived an industrious Beaver. He not only felled trees and built dams, but, on the land he cleared, he grew produce for a hungry family of rabbits. How they loved his fat, juicy carrots!

But one day Father Rabbit found that by crossing over the river on a fallen tree he could buy carrots more cheaply from a Raccoon who lived on the other side. Soon he was racing back and forth across the river. The Beaver shrugged his shoulders and went into the dry goods business. Then came a terrible flood. The fallen tree was swept away, and the rabbits could only huddle on the bank and gaze longingly across the river. They went back to the Beaver, who said, "Sorry, folks, but I'm out of the carrot business. Could you use a dozen hand towels?" One cold day Mr. Beaver met Father Rabbit foraging for food. The Rabbit was near starvation. He looked at the Beaver with tears in his eyes and wailed, "Where were you when I needed you?" And the Beaver replied, "Where were you when I needed you?"

Whether your needs be carrots or steel, your safest, most reliable suppliers are right here at home. No one knows the needs of American steel buyers better than American steel makers. To serve you, and serve you well, is our primary concern—not just today and tomorrow—but year after year.

For quality steel of certified analysis, meeting appropriate specifications, you can rely on Bethlehem Steel for such products as reinforcing bars, wire and wire products, pipe, structural shapes, plates, carbon bars . . . hot-rolled, cold-rolled, and galvanized sheets . . . transmission towers and other fabricated steel, wire rope, and industrial fasteners.

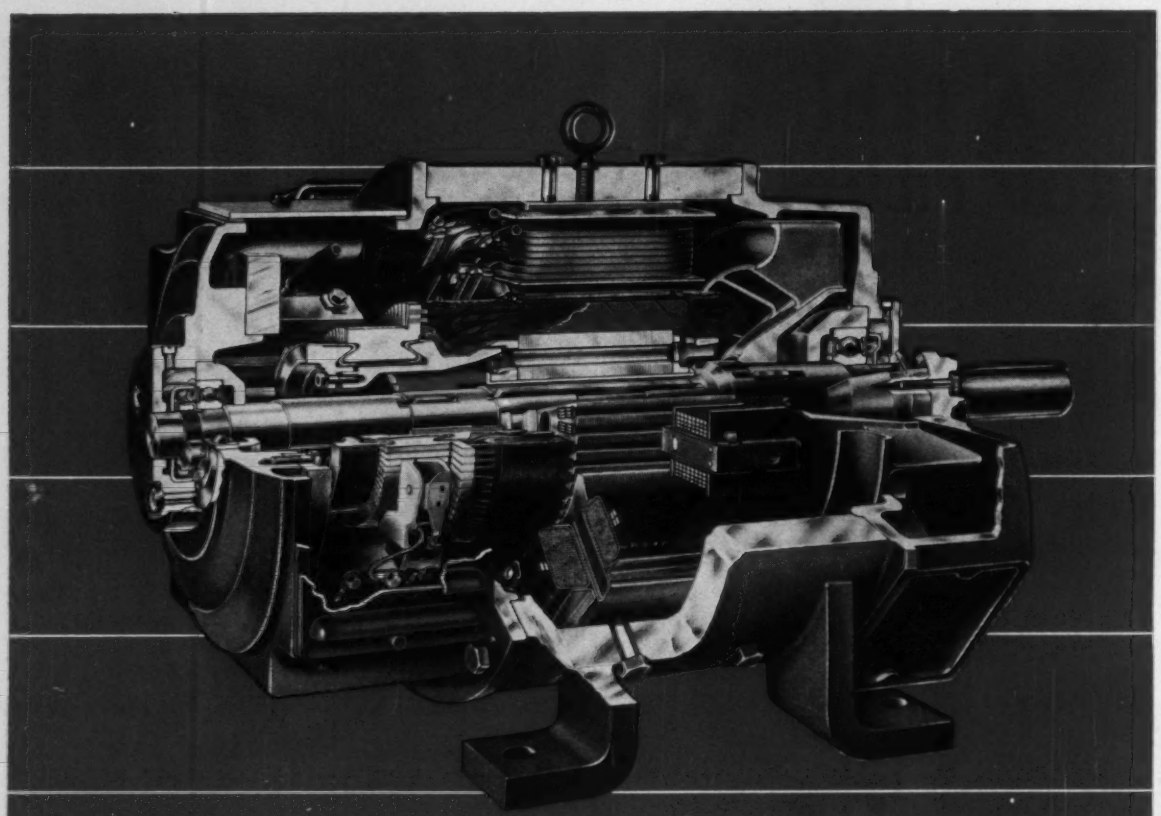
And remember, our engineers are on call to help you solve your steel-working problems.

Steel *for Strength*
. . . Economy
. . . Versatility

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM STEEL



THE RELIANCE SUPER 'T'

A New Kind of D-c. Motor With DYNAMIC RESPONSE

Here is a motor built to make maximum use of d-c. flexibility. The Super 'T' puts Dynamic Response into starts, stops, and speed changes. Dynamic Response gives you a 50% increase in torque and a 50% decrease in reaction time.

This top performance is due to advanced balanced design. Lighter, small diameter armatures cut mechanical inertia 50%. Superior Class B insulation, gives extended life even at temperatures as great as 130°C.

Top grade insulation plus engineered ventilation lets the Super 'T' take tremendous overloads. In fact, the Super 'T' can develop double normal horsepower during starts, stops, and speed changes.

The Super 'T' is a compact power package, designed inside and out for tough industrial service. From appearance to performance, the Reliance Super 'T' with Dynamic Response is today's most modern industrial motor.

C-1577

Product of the combined resources of Reliance Electric and Engineering Company and its Master and Reeves Divisions

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Duty Master A-c. Motors, Master Gearmotors, Reeves Drives, V★S Drives, Super 'T' D-c. Motors, Generators, Controls and Engineered Drive Systems.

This billet makes the toughest sections easier...less costly!

ALCAN BILLET gives you extrudability that's noticeably better... less costly! So much so in actual practice that many extruders pushing tough sections specify ALCAN billet exclusively.

Made entirely of clean primary metal and cast to the industry's closest tolerances—ALCAN billet may well be the most economical you can use. For it gives you every fabricating advantage—it pushes easier, faster... gives you longer die-life... higher recovery... and better quality of finished product.

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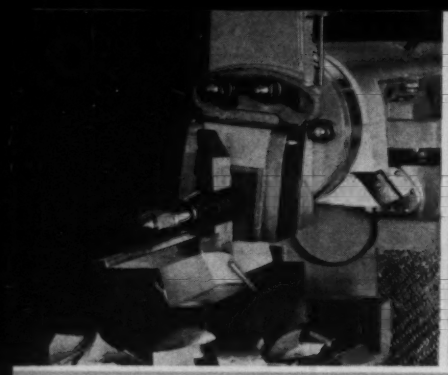
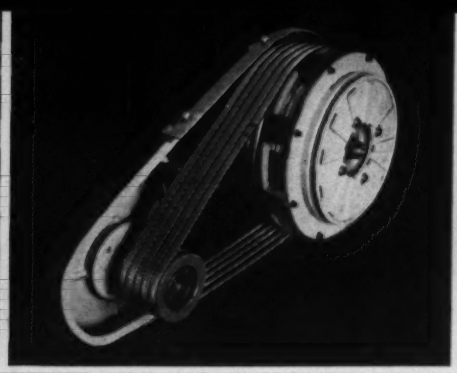
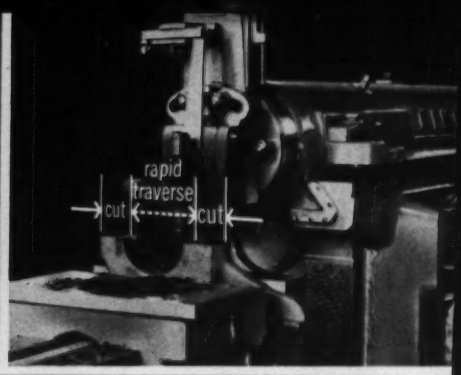


1. This 2" cut, .030" feed, proves the ability of the Cincinnati's 50 psi automatic lubrication to maintain oil films under the heaviest loads.

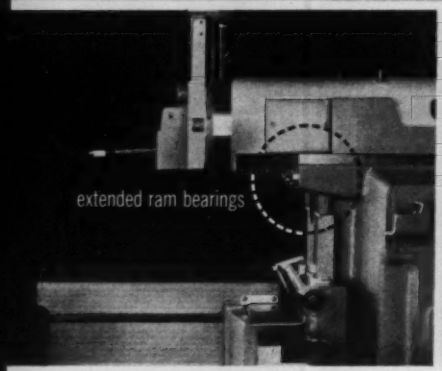


2. Brushless electromagnetic brake and clutch insure fast, easy operation of the ram without grab. They never need adjustment.

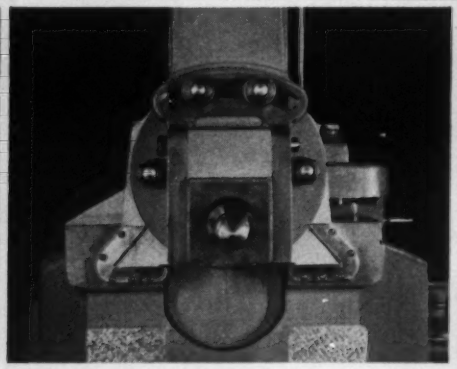


3. Both vertical and horizontal rapid traverse are standard Cincinnati features which profitably reduce time between each cut.

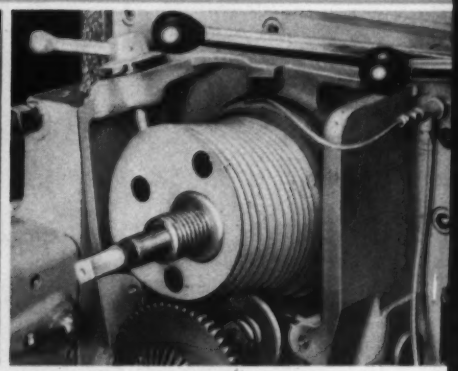
4. Extended ramway bearings increase ram support and minimize wear. Full table clearance to column provides the closest-coupled combination in the field.



5. Solid ramways, free of joints, hold the accuracy of Cincinnati shapers longer than others. Vee ways are cast integrally with the column for extra strength.

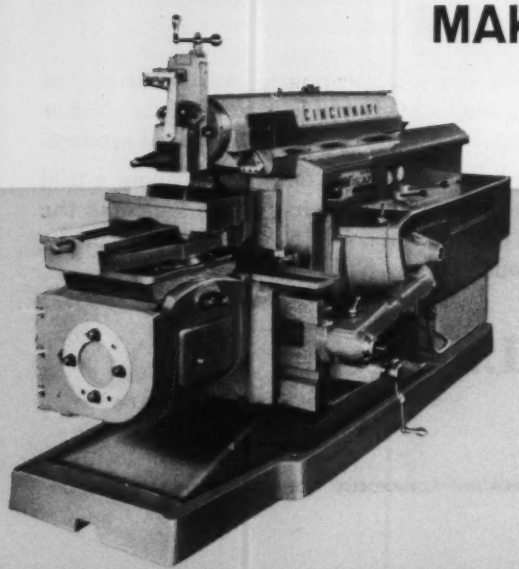


6. Individual cams for each feed, with follower always in contact give you a smooth (instead of a "bump") feed; results in superior finish on every job.



payoff features

MAKE CINCINNATI® SHAPERS YOUR BEST CHOICE



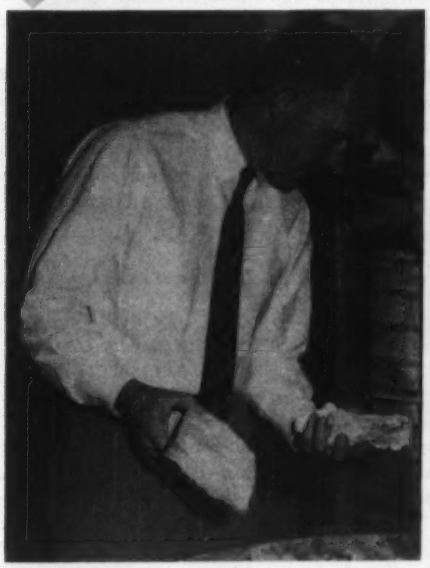
Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

In Scotland: The Cincinnati Shaper Co., Ltd., Glasgow

This Man Used . . .



This Article . . .

Blast Furnace Is Repaired With Spray-On Refractory

To Win $500

He is Allan L. Frew, purchasing agent, Waterbury Buckle Co., Waterbury, Conn., top winner in our Usership Idea of the Month contest for May. As shown above, he's examining some disintegrated firebrick that formed the core of a costly problem—until a STEEL article helped him and his company.

Our regional sales manager in New England, Cal Fisher, presented Mr. Frew with a check for $500, a commemorative plaque, and Honorary Editor Card No. 6. (Other top Usership winners received similar awards.)

Mr. Frew earned the awards by writing . . . . . "Your May 2 issue of STEEL (p. 81) described how Colorado Fuel & Iron Corp. relines blast furnaces at its Pueblo (Colo.) plant with a spray-on castable refractory material. The description of the problem rang a bell. Although we have no blast furnaces, we have several small cyanide hardening furnaces which have caused us many maintenance headaches. Relining a furnace has cost us $300 to $350, with no guarantee of how long the job might last.

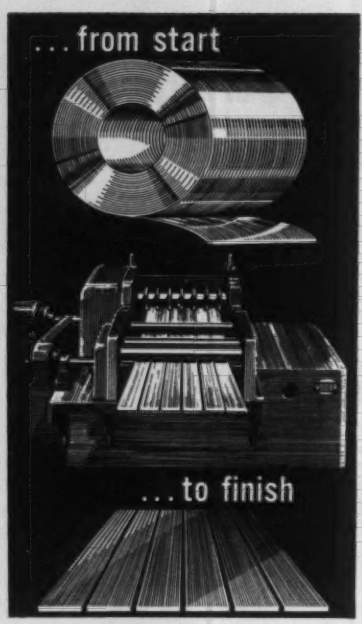
"After reading your article, I contacted a nearby firm in the refractory business and discussed the spray-on techniques. Although the company does not perform this particular type of operation, it does have a high temperature plastic refractory material which can be molded in place, baked and cured, effecting the same result as the spray-on operation—a one piece lining. The cost is just about the same as relining with firebrick (less, in some cases). There is also a one year guarantee. We contacted one firm in this area that has had this work done, and we were told that its relining job lasts four to five years, which is many times longer than our previous jobs lasted.

"The cost of the repair work is relatively insignificant compared with the loss of production that results from downtime on the furnaces. This, of course, is the nub of the problem.

"We have decided to reline one furnace with the new material. I hope to be able to report to you after the furnace has operated for a time. If the job is satisfactory, we can realize a several hundred dollar saving per downtime day vs. the older, slower relining method."

Another Distinctive Title

Six readers earned desk lighters as honorable mention awards. We wish that space permitted us to publish their letters. Forest S. Major, plant manager, Steel Products Div., Burnham Corp., Lancaster, Pa., won his second honorable mention. (The first was in our February contest.) To mark his singular achievement, the judges con-



YODER
ROTARY SLITTERS

If your slitting requirements call for coil widths from 12" to 60", in gauges from .015" to .250", the economy of purchasing Yoder Slitting Machinery can be yours. Operating a Yoder Slitting Line only one eight-hour shift per week, for example, could easily produce 35 tons of slit strands per week...or 1,820 tons every 52 weeks. At a slitting cost saving of only ½¢ per pound, the annual savings would amount to $18,200.

Additional savings can be realized through lowered inventory of mill-width coils—less waiting for delivery of special slit widths. Also, customer satisfaction will increase as you achieve faster completion and delivery of finished products.

At your request a Yoder sales engineer will study your plant operation to determine what equipment would most economically...and profitably...serve you, whether it be standard components or a completely specialized and engineered line.

Send for Yoder's illustrated text on slitting operations and equipment. It describes methods, time studies, operating cycles, material handling, and gives full specifications.

THE YODER COMPANY
5502 Walworth Avenue • Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING ROTARY SLITTING LINES

ferred upon him the title of Honorary Editor No. 7.

Dr. Hector Lazo, professor of marketing, and chairman, Department of Marketing, Graduate School of Business Administration, New York University, New York, was another honorable mention winner.

Other winners: Stephen D. Baker, mechanical engineer, Podbielniak Inc., Chicago; H. K. Eitelman, process control technician, Defense Electronics Div., Ordnance Dept., General Electric Co., Pittsfield, Mass.; Frank A. Hamric, staff mechanical engineer, Mechanical & Construction Div., Aluminum Co. of America, Massena, N. Y.; and A. D. Young Jr., industrial sales representative, Esso Standard Div. of Humble Oil & Refining Co. His territory is Waterbury, Conn. (which gives us two winners in Waterbury), but you don't have to move there to win . . .

You Can Win $1000 This Month . . .

. . . in STEEL's Usership Idea of the Month contest. Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month, July, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . you will win an additional $500 if you furnish written proof that you accomplished your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

You can enter as many times as you wish. Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. **Deadline for this month's contest is Sept. 1.**

Pointing the Way to Profits

While researching the third installment in our Materials Efficiency series, "Make Materials Work Harder," Metallurgical Editor Ed Case found many examples that point the way to profits. Here's how one company cracked a materials problem profitably: In the first pass at production, a 1400 lb hand forging was machined to a finished size of 230 lb . . . 1170 lb wound up in chips. Design and technique changes chopped the forging to 290 lb, within 60 lb of the finished part's weight.

Ed's article is chock full of other profit makers. Check them out next week.

Fluid Power NEWS

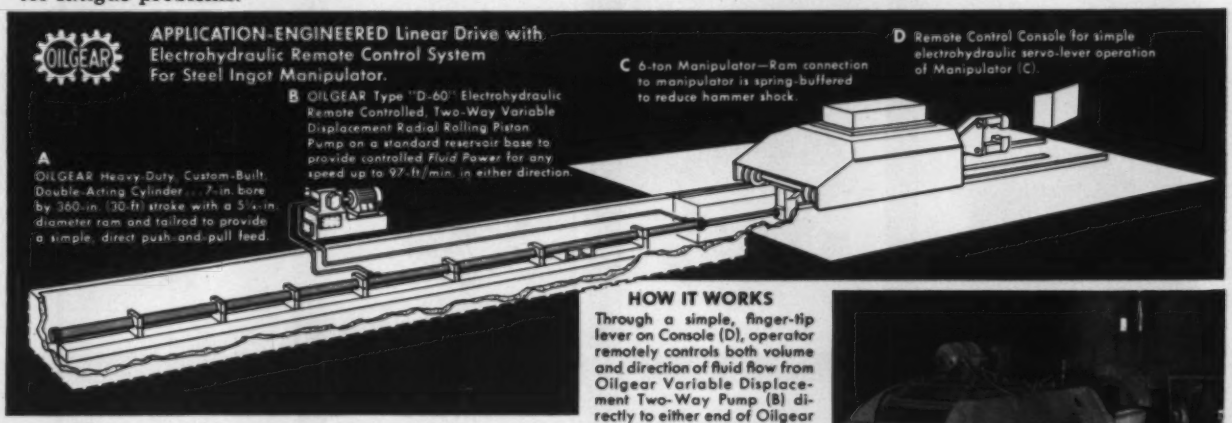
REPORT NO. 11,801 REMOTE CONTROLLED INGOT MANIPULATOR

From Oilgear *Application-Engineering* Files

HOW OILGEAR DRIVE SYSTEM ON INGOT MANIPULATOR IMPROVES CONTROL—CUTS DOWNTIME

DATA: Replace an electric variable speed drive on a 6-ton ingot manipulator because of excessive maintenance downtime, high rebuilding and replacement costs. Initial replacement plans called for a hydraulic variable speed drive directly to manipulator wheels, retaining customary practice of operators riding on manipulator. A job study revealed that while feeding an ingot under the open frame steam hammer, forward motion is momentarily stopped by each hammer impact—frequently bouncing manipulator wheels in the air, causing traction, speed control, shock, and operator fatigue problems.

Basic Manipulator Drive Requirements were re-evaluated as follows: 1. Remove drive from manipulator to reduce shock-provoked maintenance downtime. 2. Drive to be independent of wheel traction to improve feed and control. 3. Provide stepless, remote speed control from zero to maximum in both directions. 4. Withstand severe shock, vibration, heat, and dust on a continuous 16-hour day basis. 5. Reduce operating, maintenance, and installation costs. 6. Provide for future incorporation of hammer control with remote manipulator console.


APPLICATION-ENGINEERED Linear Drive with Electrohydraulic Remote Control System For Steel Ingot Manipulator.
A OILGEAR Heavy-Duty, Custom-Built, Double-Acting Cylinder . . . 7-in. bore by 360-in. (30-ft) stroke with a 5¼-in. diameter ram and tailrod to provide a simple, direct push-and-pull feed.
B OILGEAR Type "D-60" Electrohydraulic Remote Controlled, Two-Way Variable Displacement Radial Rolling Piston Pump on a standard reservoir base to provide controlled Fluid Power for any speed up to 97-ft/min. in either direction.
C 6-ton Manipulator—Ram connection to manipulator is spring-buffered to reduce hammer shock.
D Remote Control Console for simple electrohydraulic servo-lever operation of Manipulator (C).

HOW IT WORKS

Through a simple, finger-tip lever on Console (D), operator remotely controls both volume and direction of fluid flow from Oilgear Variable Displacement Two-Way Pump (B) directly to either end of Oilgear Custom Cylinder (A). Only two pipe lines are required. Power input is used only in proportion to work performed, as no pump output power is wasted in direction control valves, external relief valves, flow control valves, auxiliary components, or excessive piping. Stepless, infinitely variable, smooth, steady manipulator speeds are instantly available in either direction. Fluid flow and pressure decelerate to zero as flow direction is changed—flow and pressure then accelerate to any selected amount in the new direction . . . reversal is smooth-cushioned — shock is eliminated. Controlled acceleration and deceleration; hydrodynamic braking; automatic pressure and flood lubrication; continuous filtration of power fluid . . . all are inherent features of Oilgear "Any-Speed" Drive Systems.

Hammer operator indicated Oilgear-powered Manipulator with 5300-lb ingot.

Manipulator operator indicated. Cut-off of second 9-in. square, 90-in. bloom worked from one ingot.

SOLUTION: An Oilgear Linear Drive and Electrohydraulic Control System as shown above schematically. This departure from customary manipulator drives has proved—*in over two years of operation*—to have the following advantages: 1. Lower operating costs . . . previous manipulator averaged 12% to 15% downtime every 16-hour day for repair and adjustment of drive and control components. 2. Direct push and pull linear drive is a more positive, smoother, shockless feed—NOT affected by variations in wheel traction. 3. Remote console with simple electrohydraulic servo control eliminates operator discomfort and fatigue. 4. Cylinder is protected below floor—"Power-Pak" is mounted away from heat and dust of work area. 5. Constant, automatic overload protection insures longer life, prevents damage.

System was selected due to Oilgear's reputation for trouble-free reliability, long life, simplicity, and on-the-job-proved performance of the following *Oilgear-Powered* equipment in this user's plants . . . 300-ton ingot strippers . . . large forming presses . . . tube pointing presses . . . hydrostatic testers . . . stripping presses . . . pipe benders . . . seamless steel tube piercers . . . planers . . . cut-off machines . . . tube threaders—operating efficiently—in constant, daily use—some have been in service for more than 20 years.

User Reports—" . . . well pleased with the steady feed rate at both low and high speeds . . . we'll go to this type of drive when we rebuild or require another Manipulator."

For accurately controlled linear or rotary power—for the lowest cost per year . . . check with Oilgear!

For practical solutions to YOUR linear or rotary Controlled Motion problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . . . .

THE OILGEAR COMPANY

Application-Engineered Controlled Motion Systems

1572 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

Phone: Mitchell 5-6715 . . . Direct Distance Dialing Code 414

These sound castings made sound products

Gray and alloyed iron castings are continually being called upon to do more exacting jobs. Parts are now designed and cast to meet strength and weight standards precisely. Over-design or "rule-of-thumb" casting procedures mean penalties in weight, size or cost. Under-design or casual production controls reduce quality and dependability of the end product.

These castings were engineered to specifications at The Decatur Casting Company where high quality standards govern every step of the production process. Heat treating, when required, was done in our own furnace. The customers ordered castings to specification—and got what they ordered in every casting.

Decatur Quality Castings® are supplied in weights from a few ounces to 100 pounds. We suggest you consult us on your next casting requirements.

THE DECATUR CASTING CO.

Light Gray Iron and Alloyed Iron Castings
Decatur, Indiana *Phone: Decatur 3-2700*

Quality . . . the best economy of all

He's mopping up the mess for the last time

At a leading aircraft research center, high-frequency vibration caused severe oil leakage from hydraulic lines servicing a huge wind tunnel. Many man-hours each month were wasted cleaning up the basement floor underneath, even though drip pans were used extensively.

Now, after a change to a Suntac oil, the vibration-caused leakage has been reduced to a point where "mop-up" is not needed. Hydraulic-fluid consumption has been cut by 4000 gallons a year. That's economy! That's Sun quality—the best economy of all.

If your plant is troubled with a leaky system, a Suntac antileak hydraulic oil can save you money, too. Ask your Sun representative to show you the Suntac desk-top demonstration, or write direct to SUN OIL COMPANY, *Philadelphia 3, Pa., Dept. S-7. In Canada: Sun Oil Company Limited, Toronto and Montreal.*

SUNOCO

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

H&K
perforated materials

Passage or control of air, sound, light or fluid . . . decorative concealment . . . component protection . . . eye catching, sales-building beauty—if your product requires any or *all* of these features, you'll find the design and functional versatility you need in the Harrington & King line of perforated materials. Just four of H & K's new patterns are illustrated here. There are many more contemporary and traditional designs, all available in steel sheets for shipment from stock.

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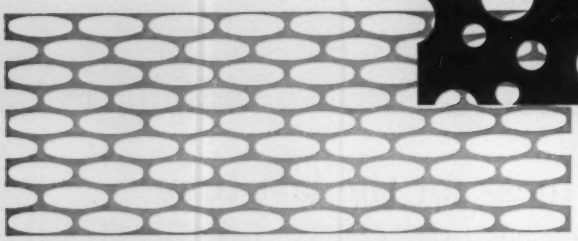

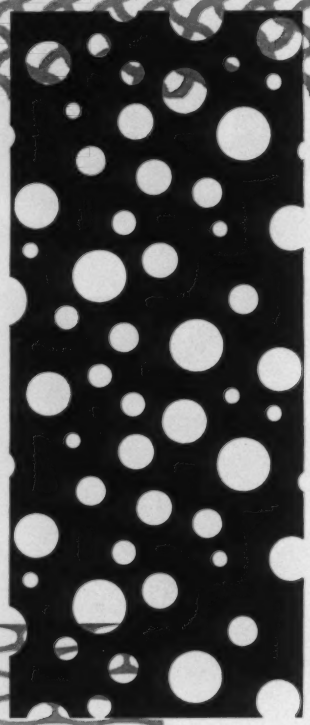

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OF MEETINGS

Aug. 8-12, American Institute of Electrical Engineers: Pacific general meeting, U. S. Grant Hotel, San Diego, Calif. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Aug. 15-17, American Society of Mechanical Engineers and American Institute of Chemical Engineers: Heat transfer conference and exhibit, Statler-Hilton Hotel, Buffalo. Information: ASME, 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Aug. 16-19, Society of Automotive Engineers Inc.: National West Coast meeting, Jack Tar Hotel, San Francisco. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 3-4, American Machine Tool Distributors Association: Annual meeting, LaSalle Hotel, Chicago. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Sept. 6-16, National Machine Tool Builders Association: The Machine Tool Exposition — 1960, International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 6-16, Production Engineering Show: Navy Pier, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

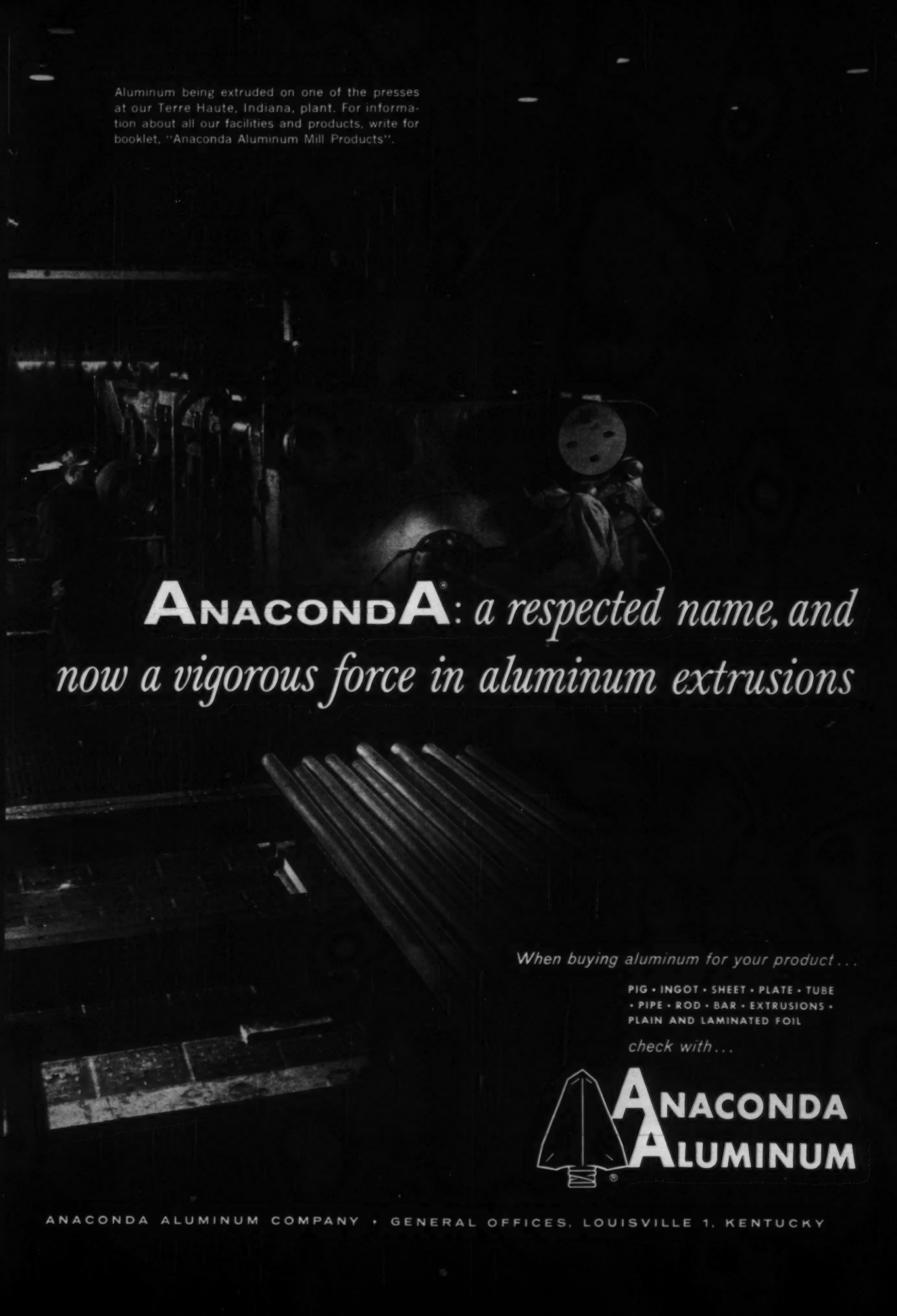
Sept. 7-9, American Society of Mechanical Engineers: Instruments and regulators conference, Massachusetts Institute of Technology, Cambridge, Mass. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Sept. 7-15, Coliseum Machinery Show: Coliseum, Chicago. Information: A. Byron Perkins & Associates, 2807 Sunset Blvd., Los Angeles 26, Calif.

Sept. 12-13, Industrial Truck Association: Fall meeting, Cavalier Club, Virginia Beach, Va. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

Sept. 12-15, Society of Automotive Engineers Inc.: National farm, construction, and industrial machinery meeting; production forum; and engineering display, Milwaukee Auditorium, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 13-15, American Chemical Society: Fall meeting and exhibit, Statler-Hilton Hotel, New York. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.



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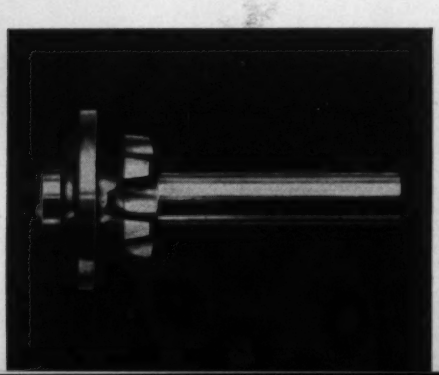

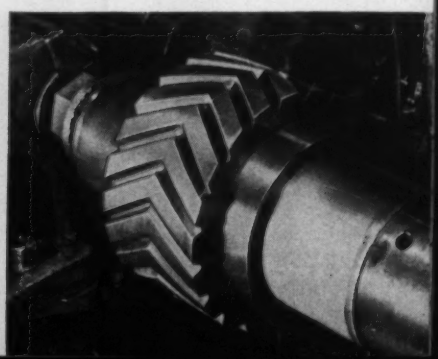

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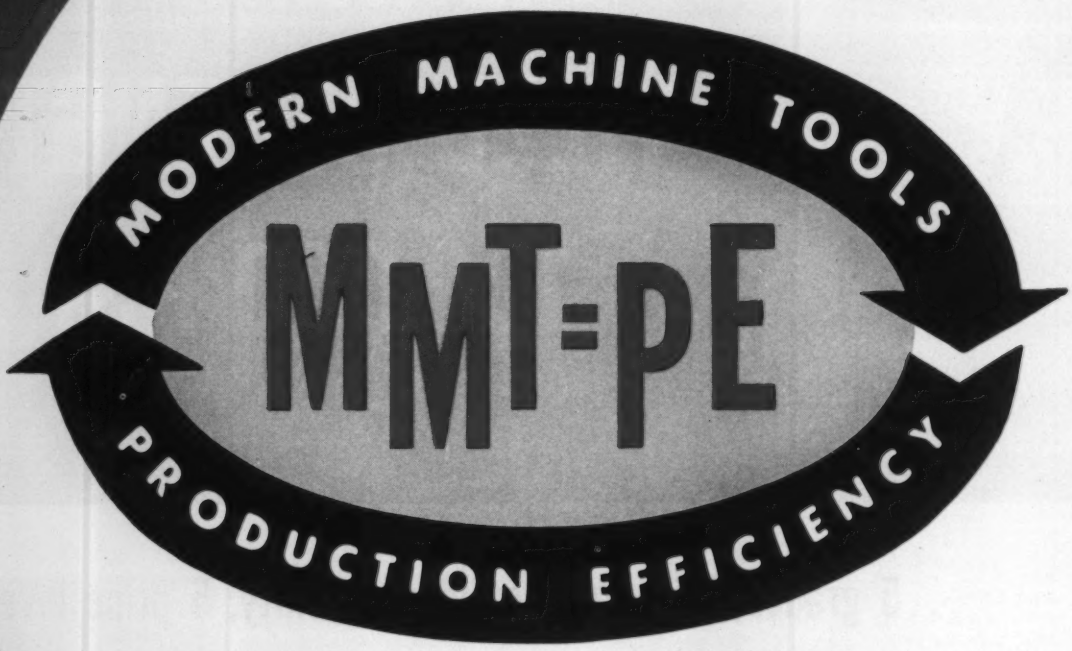

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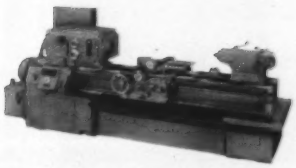
As a result, you can expect your modern Monarch to so lower costs that, after paying for itself out of savings in a 3 to 4 year span, it will continue to benefit your competitive stance for years. How? By increasing production; by lengthening tool life; by delivering such accuracy and finish as to cut considerably—or eliminate—finishing operations.

What more can your capital expenditure dollars buy? Everyone in your organization concerned with such decisions should be familiar with our story—which we'll gladly send. . . . THE MONARCH MACHINE TOOL COMPANY, SIDNEY, OHIO.



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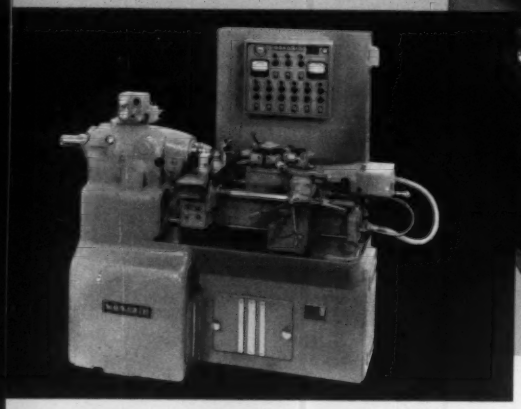
MONARCHS COST LESS

Monarch
TURNING MACHINES

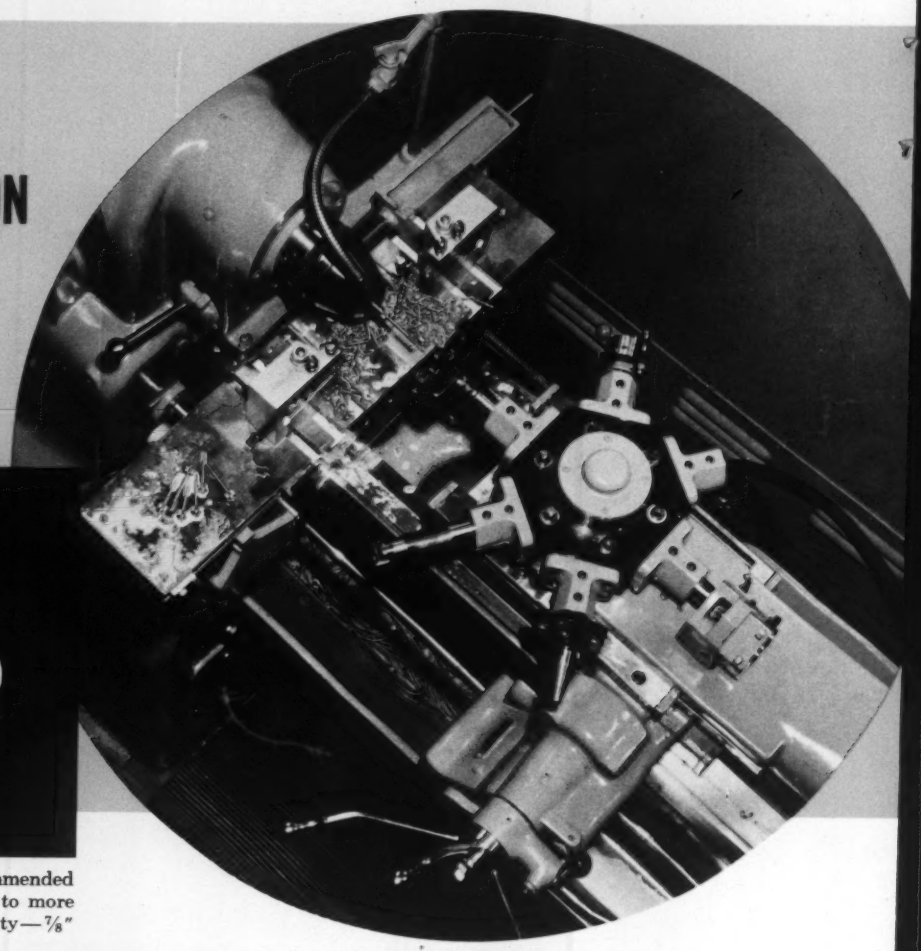
VISIT MONARCH—*We'll turn your part to return you profit*

Don't Tool Up for Tomorrow's Boom with Yesterday's Lathes

MONARCH HIGH PRODUCTION LATHES OF TOMORROW



The Model B Speedi-Matic—recommended for lots ranging from less than 25 to more than 2500 pieces. Bar stock capacity—⅞"



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Speed and accuracy of output have always typified the Monarch Speedi-Matic. Now with the latest developments in electronic speed control, a hydraulically powered turret and a host of other improvements, the 5 H.P. Model B is even better adapted to today's exacting requirements. Major features include:

(1) A control center that provides preselected, automatic speed and feed change for each tool position. Speed range is infinitely variable from 40 to 4000 R.P.M.; feed range, infinitely variable from ⅛" to 16" per minute. You get the most efficient speed and feed for each operation, consequently maximum production.

(2) A power feed, ram type turret, the turret head of which is hydraulically indexed, hydraulically located in the new position to an accuracy of less than .0002" and hydraulically clamped in position. It is also automatically lubricated.

(3) A feed box, powered by an electronically controlled feed motor.

(4) A powerful, lever operated, self-centering cut-off and forming slide that moves on preloaded ball bearings and carries its own forced feed lubrication system.

(5) Electrical controls to J.I.C. standards. The spindle and feed control elements are in the form of plug-in modules for ease of maintenance.

(6) Simplicity of setup to the degree that the time is regained during production of the first few pieces.

If one of your problems is the economical production of precision screw machine parts in small and medium size lots, then the Model B Speedi-Matic is for you. It will take only a few moments of your time to write for full information. . . . The Monarch Machine Tool Company, Sidney, Ohio.

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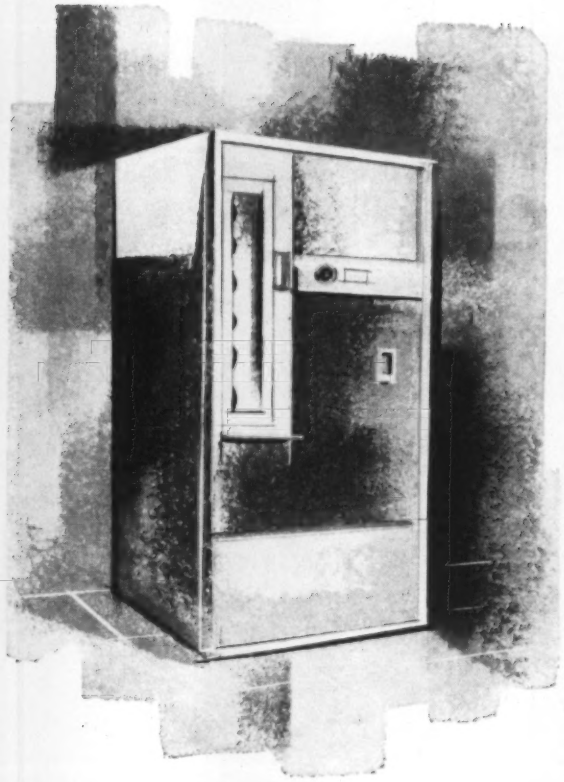
TURNING MACHINES

IF IT CAN BE TURNED, THERE'S A MONARCH TO DO IT BETTER AND FASTER



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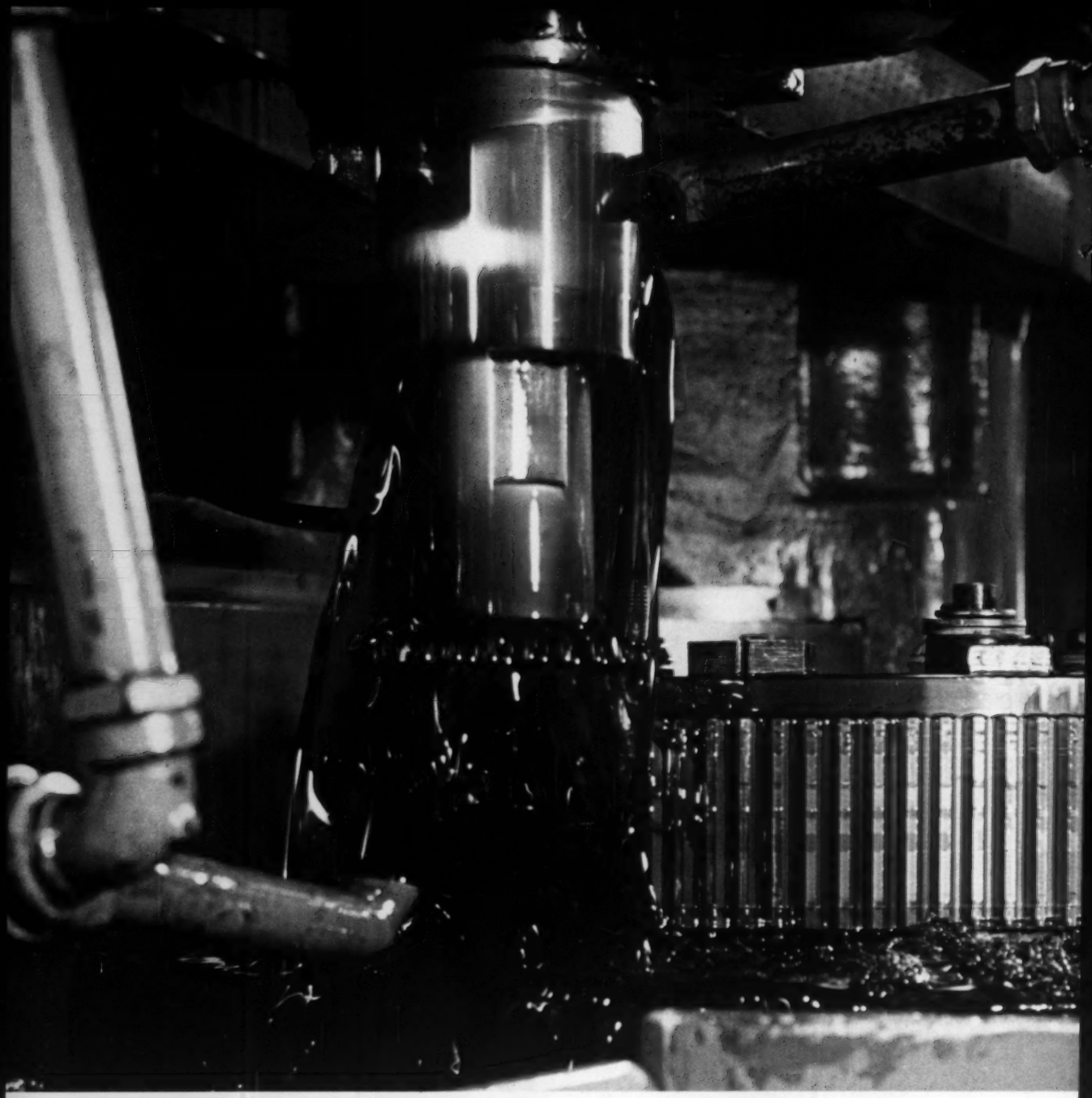


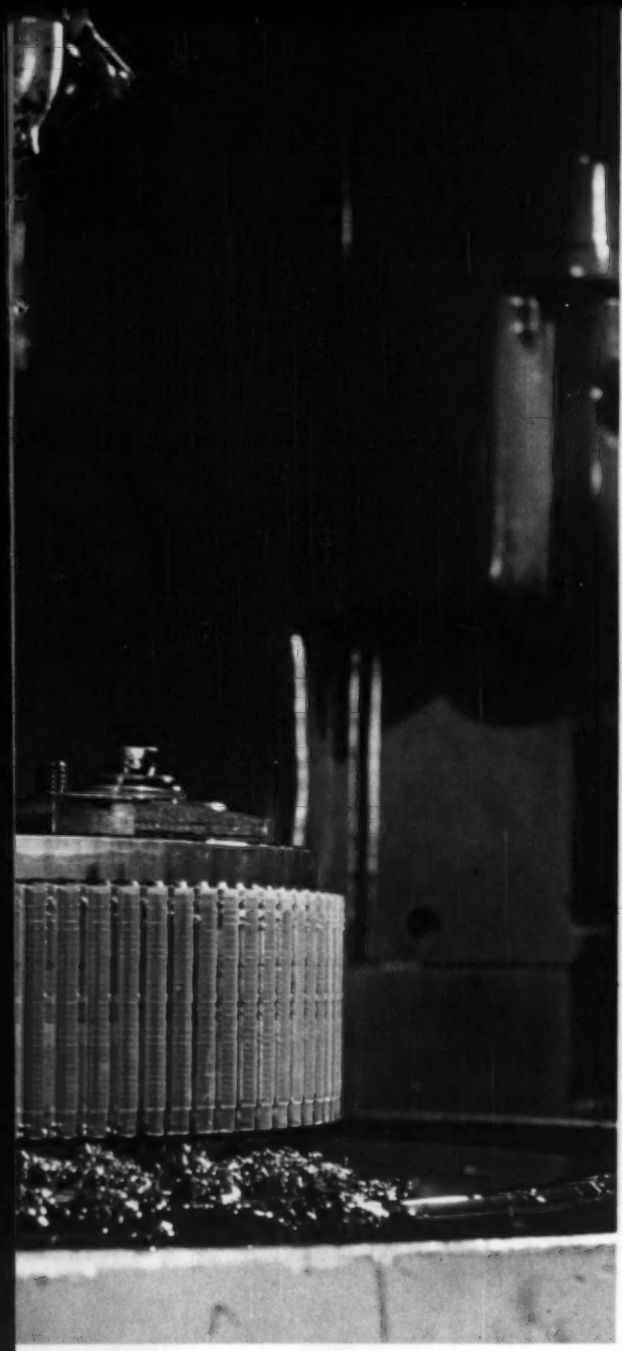
Switch to Gulfcut® oil doubles tool life for

GULF MAKES THINGS

Gang-cutting 120 teeth in stacks of 50 clutch discs made of SAE 1035 steel, .090-in. thick, to tolerances of .0033" at relatively high feeds and speeds is rough on cutting tools. But Gulfcut 21C oil makes it just half as rough at American Brakeblok Division of American Brake Shoe Company, Cleveland, Ohio.

Says Edward Salamon, Product Engineer, "As the cutting tool on the Fellows Gear Shaper enters each disc, there is an impact, generating additional heat and increasing the tendency for the tool to chip. With the machine making 86 strokes a minute tool life used to be rather short. Since changing our cutting oil to Gulfcut 21C we've achieved two benefits: we've doubled our tool life, and we've rid the operation of the very unpleasant odor of the previous oil."

"The substantial increase in tool life and over-all oper-



Wally Pavlak, Foreman, left, shows Thomas F. Irving, Gulf Sales Engineer, that tolerances of .0033" have been maintained with help of Gulfcut 21C.

◀ Changing to Gulfcut 21C has doubled tool life in this Fellows Gear Shaper, here cutting a stack of 50 clutch discs, each .090-in. thick.

American Brakeblok . . .

RUN BETTER!

ating efficiency," says Mr. Salamon, "has shown us that we don't need to be cutting oil specialists. We just call in a Gulf Engineer to provide the answers."

See for yourself how Gulf makes things run better! A call to your nearest Gulf office will bring a Gulf Sales Engineer with practical help. Meanwhile, send for your free copy of "Metal Machining with Cutting Fluids," the new 116-page handbook on their selection and use.

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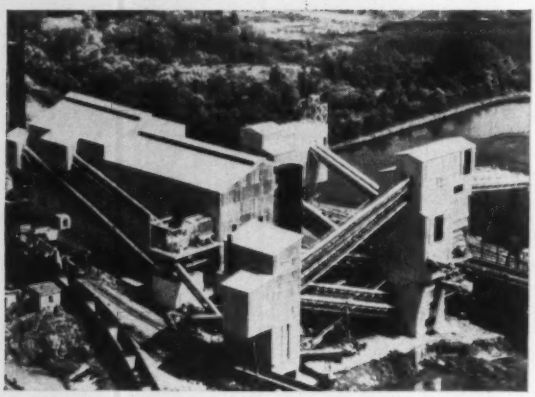

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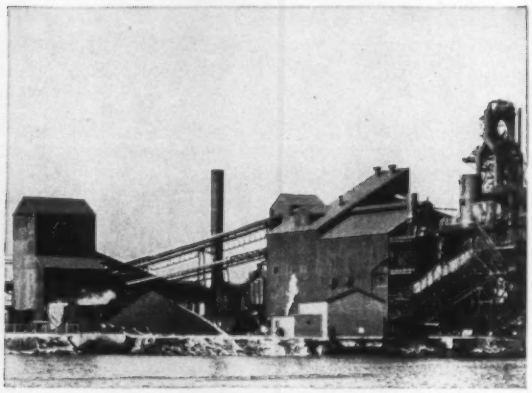

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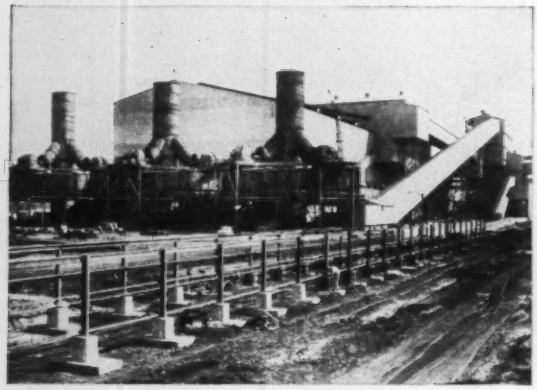

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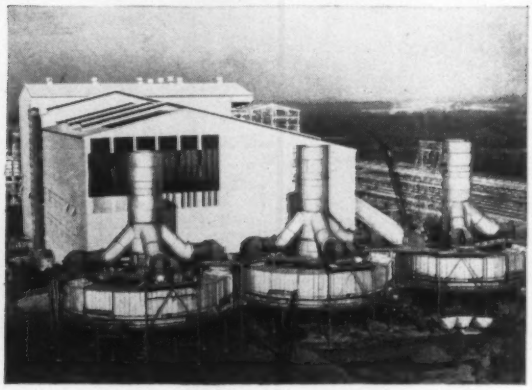

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Sinter machine length: 184′
Sinter machine area: 2419 sq. ft.
Engineering constructor—Dravo Corporation
For: Jones & Laughlin Steel Corporation, at Aliquippa, Pennsylvania

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FOR ACCURATE FLATNESS, STRAIGHTNESS, WIDTH, GAUGE AND EDGE FINISH *PLUS* SPECIFIC PHYSICAL PROPERTIES

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When you require specific physical properties combined with accurate dimensions in spring steel, call Sandvik.

From composition, through processing to the finished strip, Sandvik has had long experience in precision-control. That is why you find Sandvik steels used for feeler gauges, watch springs, compressor valves, camera shutters, reeds, shock absorbers and many other exacting spring steel applications.

Sandvik supplies cold rolled specialty strip steels—

- **In special analyses for specific applications.**
- **Precision-rolled thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered—scaleless or polished bright, yellow or blue.**
- **With square, round or dressed edges.**

Sandvik stocks a wide variety of qualities and sizes. In addition Sandvik has Rolling, Slitting, Edge-Filing and Hardening and Tempering facilities.

NEW, FREE BROCHURE

Gives Specific Data On Sandvik Cold Rolled and Hardened and Tempered Strip Steels. Catalogs leading types by application and lists finish, usual size range and chemistry. Send for your copy today.

SANDVIK STEEL, INC.
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SANDVIK CANADIAN LTD. P. O. Drawer 1338, Sta. O., Montreal 9, P. Q.
WORKS: Sandviken, Sweden

Sandvik Quality Steels

1. Performs like a regular fork lift truck . . .

2. Stacks *left* 90° in narrow 6′ aisles . . .

3. Stacks *right* 90° in same narrow aisles . . .

4. Drives loads into trailers and boxcars!

One truck . . . one operator . . . does all this!

(Only the new Towmotor "Naro-Aisle-Stack" Truck can!)

- **Only truck of its kind for narrow 6-foot aisle stacking**
- **One lift truck does the work 3 trucks usually do**
- **Makes 36.5% of "lost" space usable in average plant**

Amazing performance? You can't imagine what the "Naro-Aisle-Stack" lift truck will do until you actually see it . . .

See how it pivots loads a full 180° because it's equipped with hydraulic outriggers. See how it stacks materials left or right 90° and picks up loads from the same extreme angle. See how it also performs all other functions of regular fork lift trucks.

Most spectacular of all is the way it performs within the confines of narrow, six-foot aisles—enabling you to utilize storage space you considered "lost"!

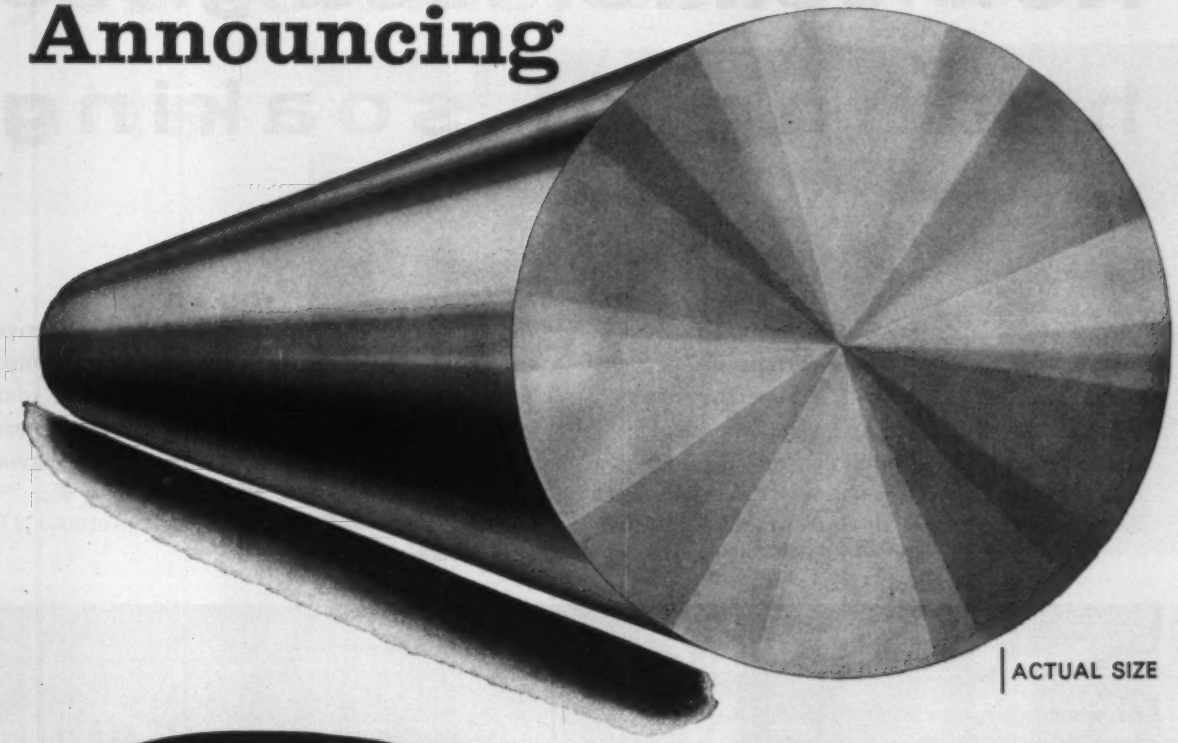
Such unique operation is made possible only because "Naro-Aisle-Stack" trucks are equipped with *Towmotor Towmostatic Drive* – the only drive of its kind that eliminates clutch, transmission, drive line, differential and shifting mechanism.

Ask for booklet, "Captures Lost Space," describing the new series. Write Towmotor Corporation, Cleveland 10, Ohio.

New Naro-Aisle-Stack Trucks made only by . . . TOWMOTOR® THE ONE-MAN-GANG – GERLINGER

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

Announcing



ACTUAL SIZE

STRESSPROOF®
STEEL BARS
WITH COPPER

In Diameters Through 4"

Larger sizes open new application opportunities.
Same high strength as smaller diameters...100,000 psi yield.
Fast machining...83% of B1112.
Cost less than heat treated in-the-bar alloys.
Ideal for both production *and* maintenance applications.

No heat treating necessary

Available from your
Steel Service Center

Ask for Helpful Data Bulletin #15.
It tells the story of STRESSPROOF.

La Salle STEEL CO.

1414 150th Street
Hammond, Indiana

Name_____

Title_____

Company_____

Address_____

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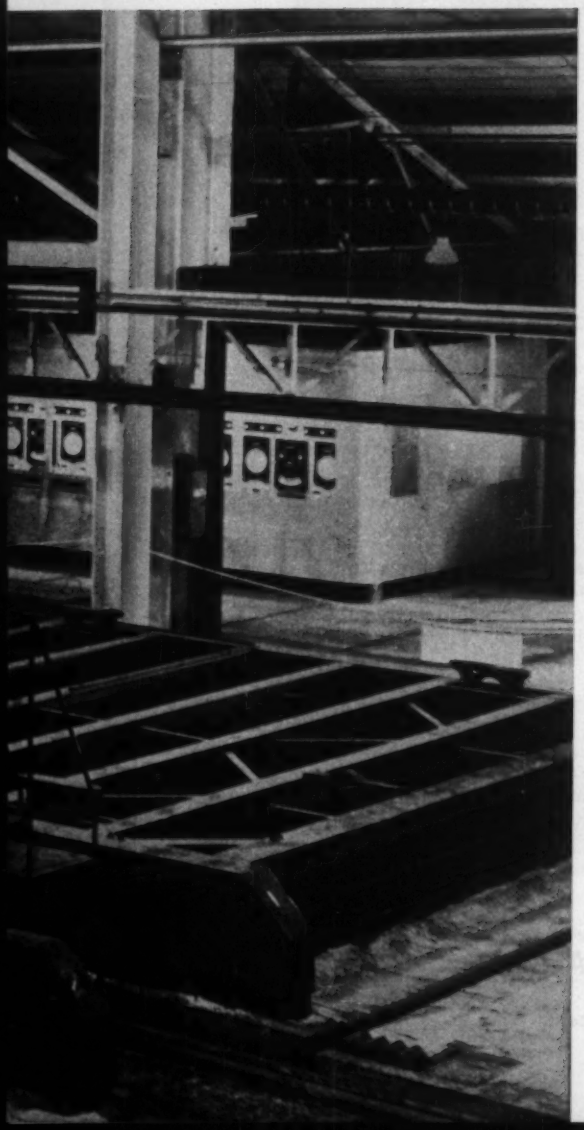
New control idea gives heating of soaking

At one of Canada's largest steel companies, a new idea in soaking pit controls permits independent selection of fuel for each pit. The operator uses high Btu fuel for cold steel, and simultaneously feeds less expensive gases to pits that are just holding a heat. He uses only the gas he needs to get the heat he wants. Also, he gets closer control of pit temperature than ever before possible, and ideal protective atmospheres. Your nearby Honeywell field engineer is ready to help you get these advantages in your soaking pit operations. Call him today, he's as near as your phone. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17.

you flexible, economical pits



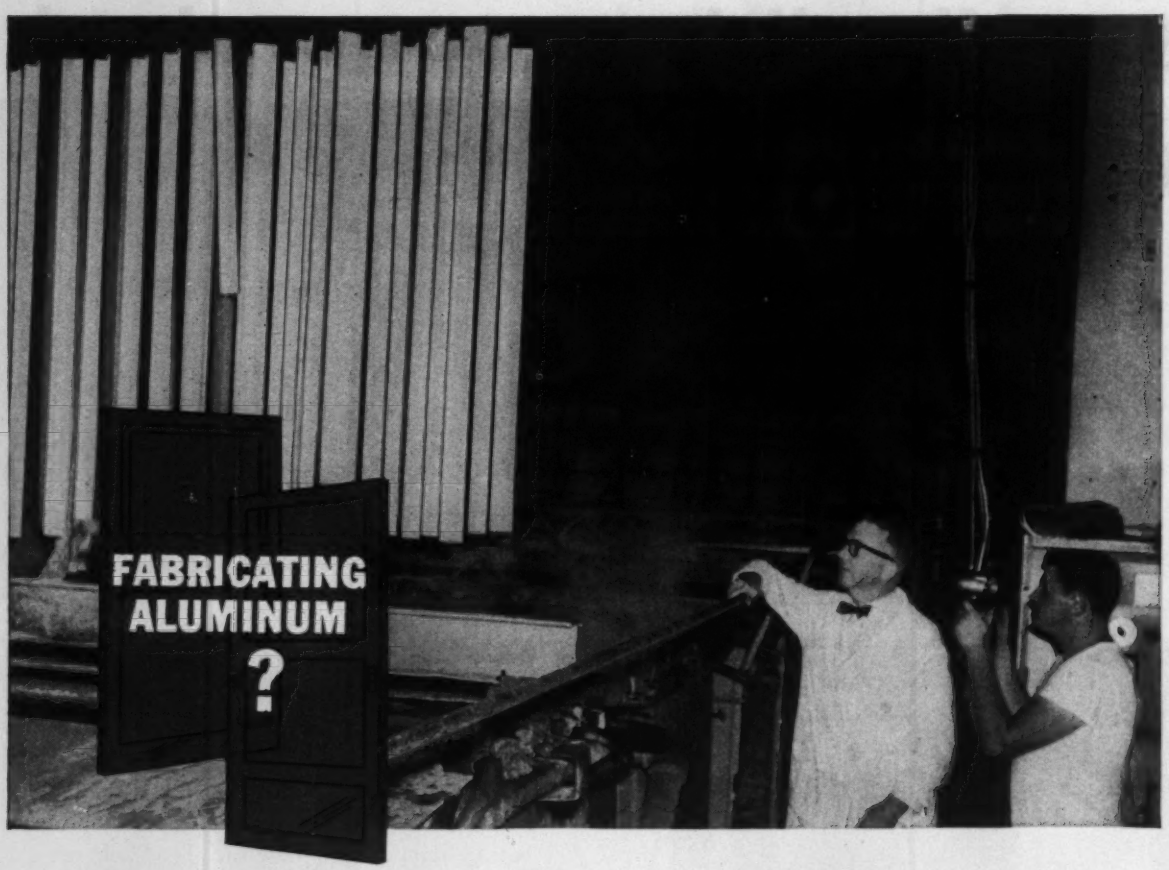
Controls like these give flexible and economic heating of 12 thirty-ton capacity soaking pits, permit independent selection of fuel (coke oven gas, blast furnace gas, or a mixture) for each pit, maintain within each pit the turbulent flows necessary for good soaking and top-to-bottom temperature uniformity, and help provide the best possible protective furnace atmospheres. Protective devices built into the system automatically safeguard against failure of power, fuel or compressed air. Stack dampers can be raised manually, even while under automatic control. The system also closes dampers, cuts out combustion air, and reduces gas flow automatically when the covers open.

75th YEAR
PIONEERING THE FUTURE

Honeywell

First in Control

SINCE 1885



Pennsalt Cuts Metal Finishing Costs

with "work-together" chemicals and machines

Does your investment in metal preparation chemicals—$40,000 a year or more in a typical aluminum fabricating plant—really work well with the half million dollars' worth of equipment that uses these chemicals?

Your metal finishing dollars will go further when machines and chemicals are working together . . . the way they do when you use Pennsalt's System Approach to metal surface preparation. Because Pennsalt supplies both the chemicals and equipment, we can treat your metal finishing line as an integrated system. It's the "work-together" way to make your investment pay off in peak production, top quality and low unit cost.

And Pennsalt's Metal Preparation Service Plan makes sure you keep getting top performance, too. Personalized service from a nationwide organization analyzes your metal preparation needs, recommends the right "work-together" equipment and chemicals, aids installation and startup of automatic machines and follows up with regular service calls. Write for free Booklet 343, "The Pennsalt Metal Preparation Service Plan" . . . and see how we can help your metal finishing dollars stretch further.

Pennsalt Metal Finishing Equipment • Washers • Automatic coating machines • Automatic phosphatizing machines • Automatic pickling machines • Drying and finish bake ovens • Paint spray booths • Complete finishing systems

Pennsalt Metal Processing Materials • Cleaners for all metals • Etchants and brighteners • Descaling and pickling compounds • FOSBOND® phosphatizing agents • FOSCOAT® pre-lubricant coatings • FOSLUBE® drawing lubricants • DRAWCOTE® deep-drawing lubricants • Paint strippers and strippable vinyl coatings

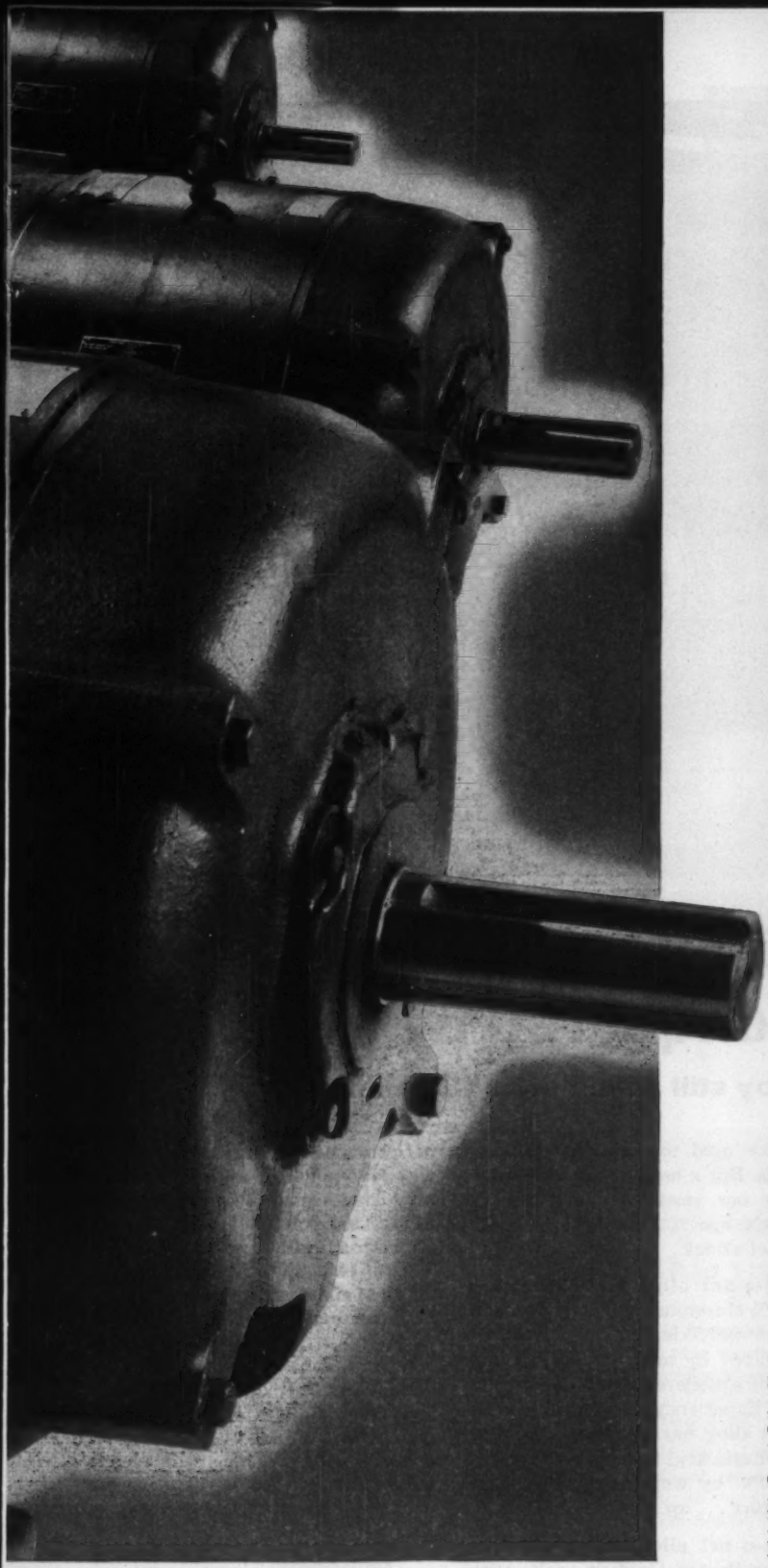
. . . a better start for your finish®

METAL PROCESSING DEPARTMENT

PENNSALT CHEMICALS CORPORATION

East: 3 Penn Center, Philadelphia 2, Pa.
West: 2700 S. Eastern Ave., Los Angeles 22, Calif.

Pennsalt Chemicals
ESTABLISHED 1850



1960
16,450,000 horsepower
1965
26,000,000 horsepower

In the next five years demand by industry for motors to drive air moving equipment is going to increase about 60% . . . from 16,450,000 horsepower in 1960 to 26,000,000 horsepower in 1965. Other needs are rising even faster. Careful matching of motor to equipment will assure minimum shutdowns for repairs and maintenance. Century Electric application engineers can help you get that right motor by selecting from among the over 10,000 types Century makes.

All types of equipment—Take hard-to-start pumps and compressors . . . with Century Electric motors designed for this kind of application, starting is no problem.

Same thing holds true for fans, pumps, machine tools, ball mills, printing presses . . . Century Electric has the right motor for each.

Reliable operation—Bonded "Mylar" and high-temperature varnish insulation give tough mechanical strength and resistance to moisture . . . rigid cast iron or steel frames mean long life and quiet operation . . . rotors get special balancing tests before shipment to eliminate vibration and assure longer life. . . .

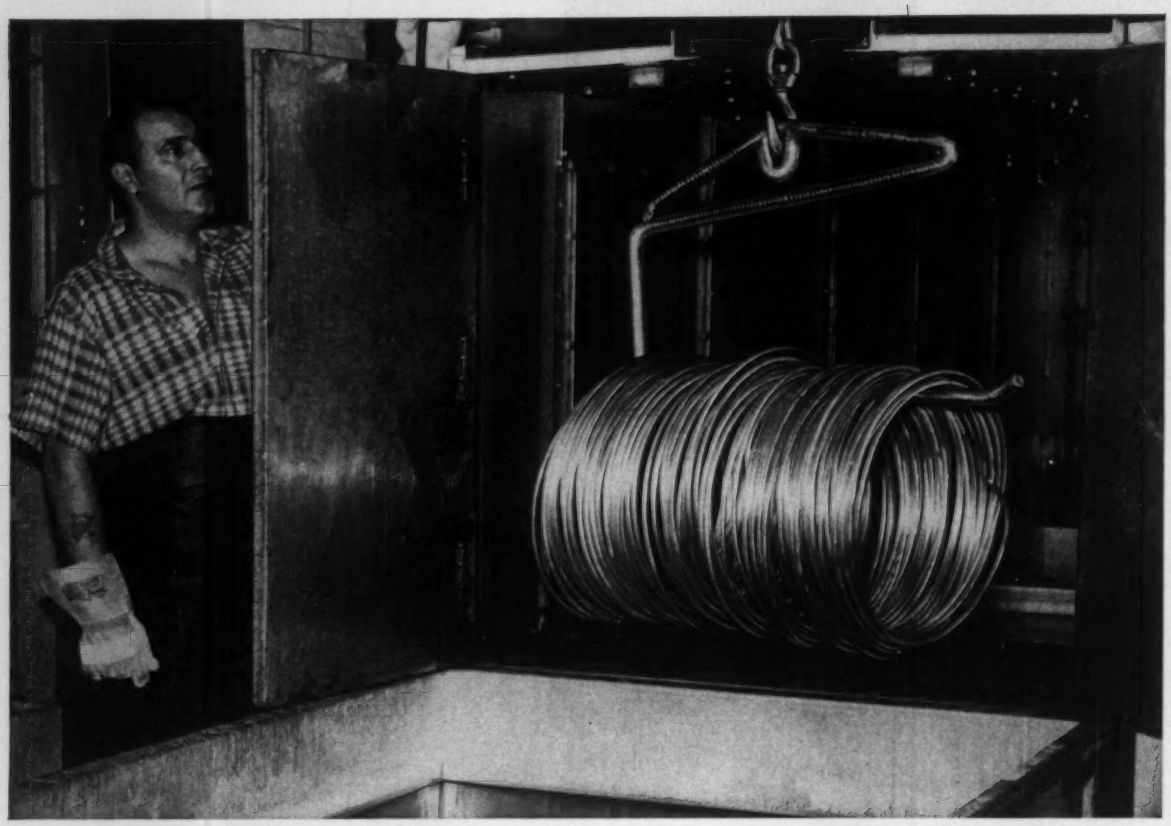
Application aid—To be sure you have the right motor for each application, contact your nearest Century Electric application engineer. He knows motors inside and out because he sells, applies and thinks motors day after day. For details on Century's complete line of motors, write for the Century Motor Application Guide, bulletin 270A. For *more* than a motor . . .

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri *Offices and Stock Points in Principal Cities*

Century

59-15A



3-week life limit in hot H_2SO_4-HNO_3 mixtures...conquered by Ni-o-nel

Ni-o-nel alloy still sound after 18 months

Are you looking for a metal to withstand constant attack by viciously corrosive hot acid *mixtures?* Perhaps the answer is Ni-o-nel* nickel-iron-chromium alloy . . . formulated to fight unusually severe corrosion.

Here's the kind of corrosion problem you can solve with Ni-o-nel alloy. In this processing cycle, first dip is 12% sulfuric acid with 8 ounces of sodium dichromate per gallon. Second dip is 60% sulfuric, 25% nitric, 0.2% hydrochloric acids. Both baths are heated to 160° F.

Leach & Garner Co. of Attleboro, Mass., manufacturer of precious and non-ferrous sheet, wire, and tubing, reports that just three weeks of this service used to ruin their pickling hooks. But a hook made of Ni-o-nel alloy bar stock was installed *18 months ago* . . . and still shows no sign of attack.

Ni-o-nel alloy is 42% nickel, 21.5% chromium and 30% iron with added molybdenum and copper. It's stabilized by additions of titanium and by a moderately low carbon content. Experience shows that this unusual alloy has excellent resistance to sulfuric acid in concentrations up to 40% by weight at boiling temperature . . . up to 60% at 80°C.

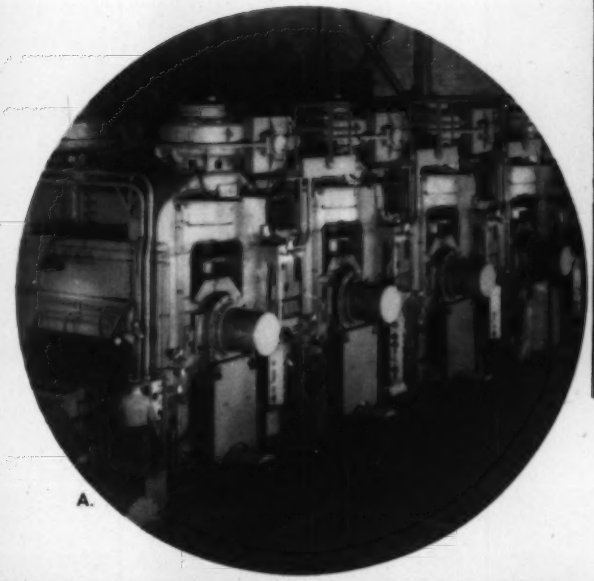
Ni-o-nel alloy resists oxidizing chemicals, too. Oxidizing salts other than chlorides usually *improve* its performance in sulfuric acid. That's why Ni-o-nel alloy delivers remarkably long service in mixtures containing nitric acid . . . cupric sulfate . . . ferric sulfate

Find out now where you can use Ni-o-nel alloy... a proved engineering material available in all standard mill forms including seamless tubing. They're easy to weld, form and fabricate. Want full details? Write for Technical Bulletin T-37, "Engineering Properties of Ni-o-nel." And let us know your problems with metals in corrosive service. Perhaps we can help you find practical answers.

*Inco trademark

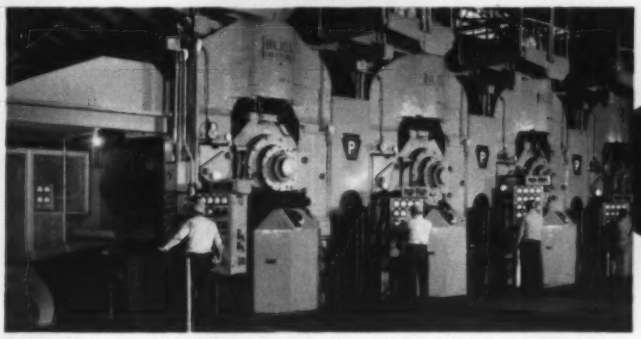
HUNTINGTON ALLOY PRODUCTS DIVISION
The International Nickel Company, Inc.
Huntington 17 West Virginia

NI-O-NEL®

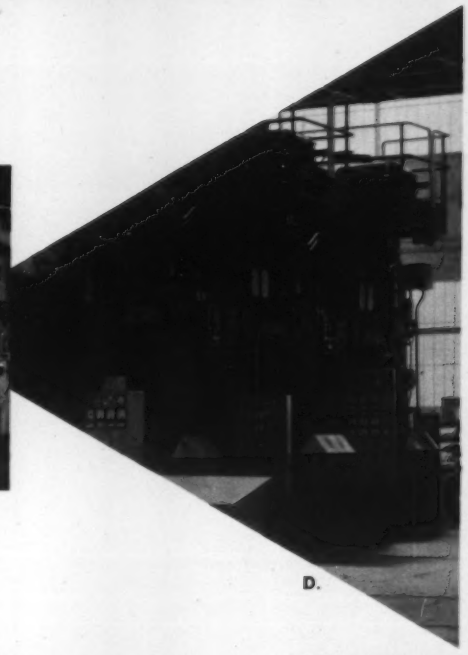


A.

B.



C.



D.

Many of the world's most modern tandem cold-reduction mills carry this trade-mark . . .

A. Fastest, most powerful mill of its kind: Delivery speed of 3800 feet per minute and 24,000 connected horsepower make this the fastest, most powerful cold-reduction mill of its type in the world. It rolls steel strip in widths up to 72″ in coils as heavy as 60,000 pounds.

B. Large tonnage orders or a few coils: Versatility is the design keynote of this Bliss tandem mill. Strip ranges up to 48″ width. Tension reel, coil buggy and horizontal belt wrapper handle coils weighing as much as 34,000 pounds.

C. Speed and precision of control: This big Bliss tandem mill rolls a variety of steels, including stainless and tinplate, delivering strip at speeds up to 3200 fpm in widths to 60″ in coils as heavy as 60,000 pounds. Special electronic controls detect gage variations of .001″, reset rolls in split-seconds.

D. First of its kind: This Bliss tandem mill will have a planned fourth stand added later this year. The mill rolls steel strip up to 60″ width; was the first multiple-stand cold-reduction mill in the country in which it is installed.

BLISS
SINCE 1857

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

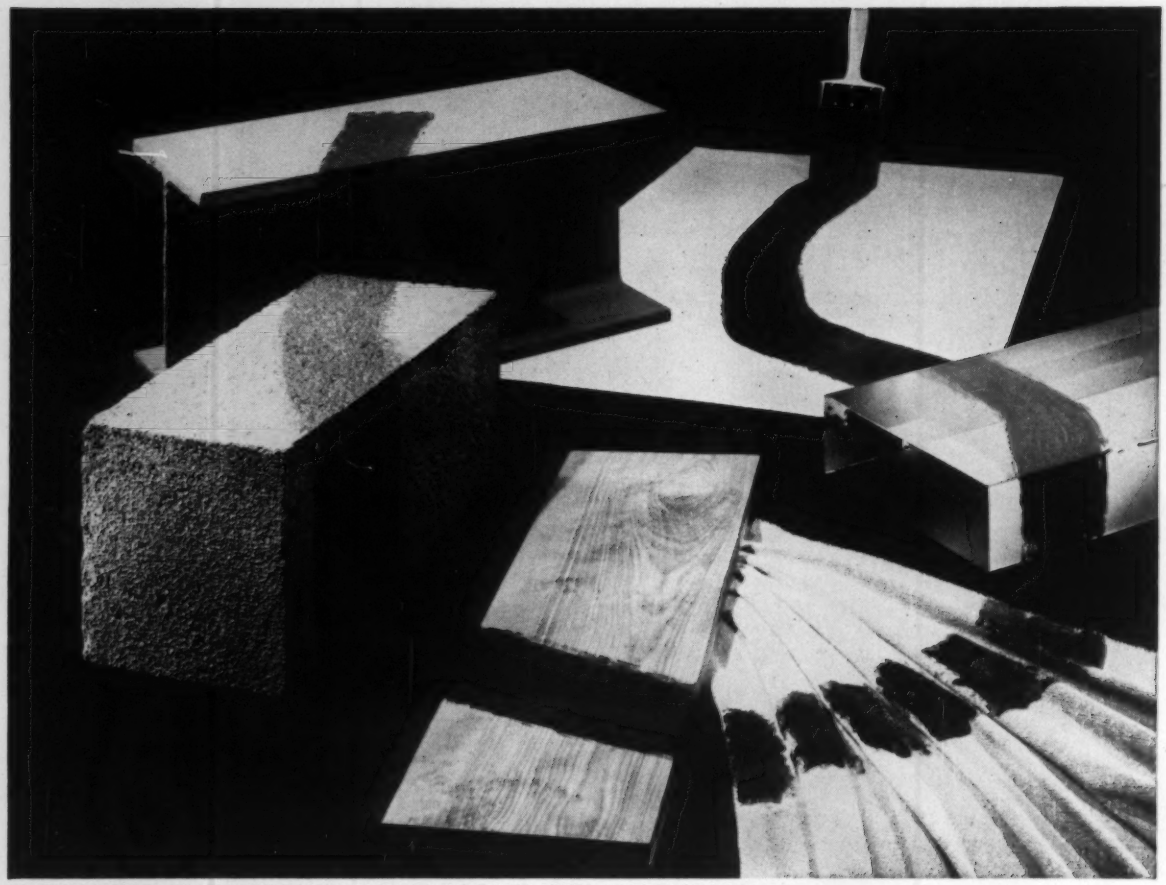
Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

Write for your complimentary copy of our 84-page Rolling Mill Brochure, Bulletin 40-B.

NEWEST WEAPON IN THE WAR AGAINST CORROSION AND ABRASION!

Coro-Gard® 1706

BRAND PROTECTIVE COATING



PROTECTS MOST SURFACES FROM CORROSIVE FLUIDS AND FUMES, WATER OR ABRASIVE PARTICLES

From the Research Laboratories of 3M comes a remarkable new coating to fight corrosion—CORO-GARD 1706 Brand Protective Coating. This neoprene rubber based coating air-cures to a tough, rubbery, protective film with exceptional resistance to corrosive fluids and fumes, water and abrasion. It maintains exceptional adhesion, flexibility, corrosion and abrasion resistance even after these strenuous test conditions: 2000-hour salt-spray attack; 20 weeks' submersion in 20% solution of hydrochloric acid; six-month weather exposure in Miami, Florida.

CORO-GARD 1706 Coating speeds production, provides unusually high coverage to cut costs. It brushes as easily as paint, is self-priming, yet goes on vertical surfaces with minimum sagging. For steel, aluminum, wood, concrete, cloth and some plastics—wherever corrosion or abrasion must be fought—specify new CORO-GARD 1706 Coating. It provides maximum protection at low cost.

For complete performance data without obligation, write today on your company letterhead to: AC&S Division, 3M Company, Dept.SBEE-70 St. Paul 6, Minn.

"Coro-Gard" is a reg. TM of 3M Co.

ADHESIVES, COATINGS AND SEALERS DIVISION

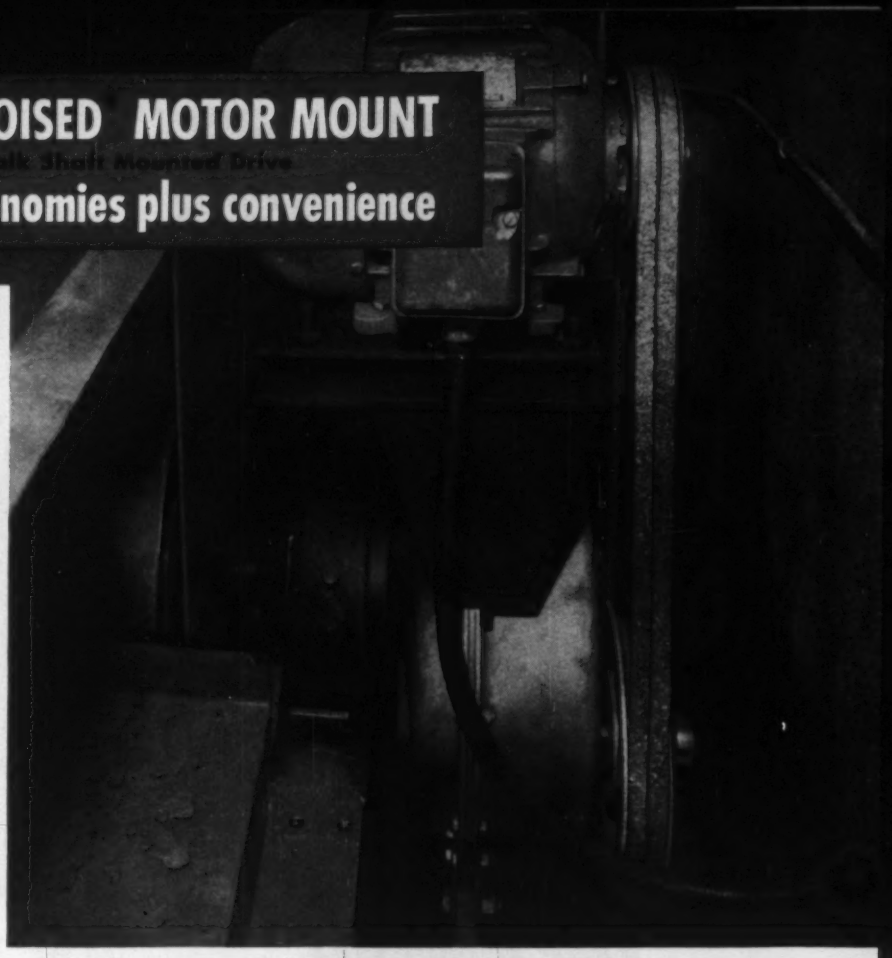
MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

NEW FALK EQUI-POISED MOTOR MOUNT

gives unequaled economies plus convenience

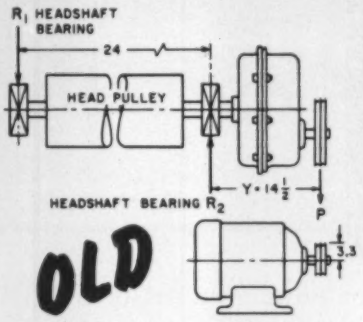


HOW A FALK EQUI-POISED MOTOR MOUNT REDUCES BEARING LOADS ON A DRIVEN MACHINE

GIVEN: Motor—15 hp, 1750 rpm, Frame 284U, Weight—320 lb.
Sheave diameters—6.6/9.4
Driven machine—belt conveyor with 24" center distance between headshaft bearings.

NOTE: Weights of 307J24 Shaft Mounted Drive, sheaves, and V-belts are eliminated from calculations because they remain constant; do not affect the comparison.

WITHOUT FALK MOTOR MOUNT



Torque at motor shaft = $\frac{63{,}025 \times 15 \text{ hp}}{1750 \text{ rpm}} = 540$ lb-in.

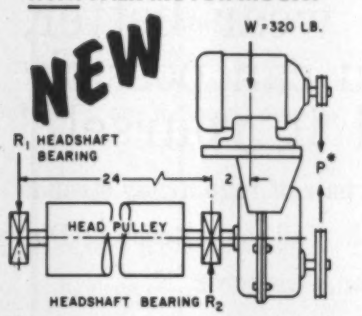
Belt pull (P) = $\frac{540 \text{ lb-in.} \times 1.5 \text{ Load Connection Factor}}{3.3"} = 246$ lb

$R_2 = \frac{246 \text{ lb} \times (24" + 14.5")}{24"} = 395$ lb

$R_1 = \frac{246 \text{ lb} \times 14.5"}{24"} = 149$ lb

(Check: 395 lb—149 lb=246 lb)

WITH FALK MOTOR MOUNT



*P = ZERO REACTION AT HEADSHAFT BEARINGS

V-belt pull has zero reaction on headshaft bearings. Therefore—

$R_2 = \frac{320 \text{ lb} \times (24" + 2")}{24"} = 347$ lb

$R_1 = \frac{320 \text{ lb} \times 2"}{24"} = 27$ lb

(Check: 347 lb—27 lb=320 lb)

Falk's new EQUI-POISED* Motor Mount is a

rigid, all-steel weldment, pre-drilled for bolting standard NEMA foot-mounted motor (1/2 to 30 hp) directly to the steel frame of Falk Shaft Mounted, Flange Mounted and Screw Conveyor Drives. With it, motor can be mounted in almost any position around perimeter of reducer.

(*Balancing of forces.)

Substantial Savings for You

It saves engineering time required to design special motor bases and foundations...saves cost of labor and materials required to build special motor foundations...and saves on equipment costs by using a quality stock component. Further, its quick installation and easy maintenance mean added cost savings. The Motor Mount is a space saver, too. Where restricted space is a factor, ability to mount motor in any of several positions is an important convenience...For information on range of sizes, dimensions, etc., contact your Falk Representative or Distributor—or write direct for Bulletin 7100.

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

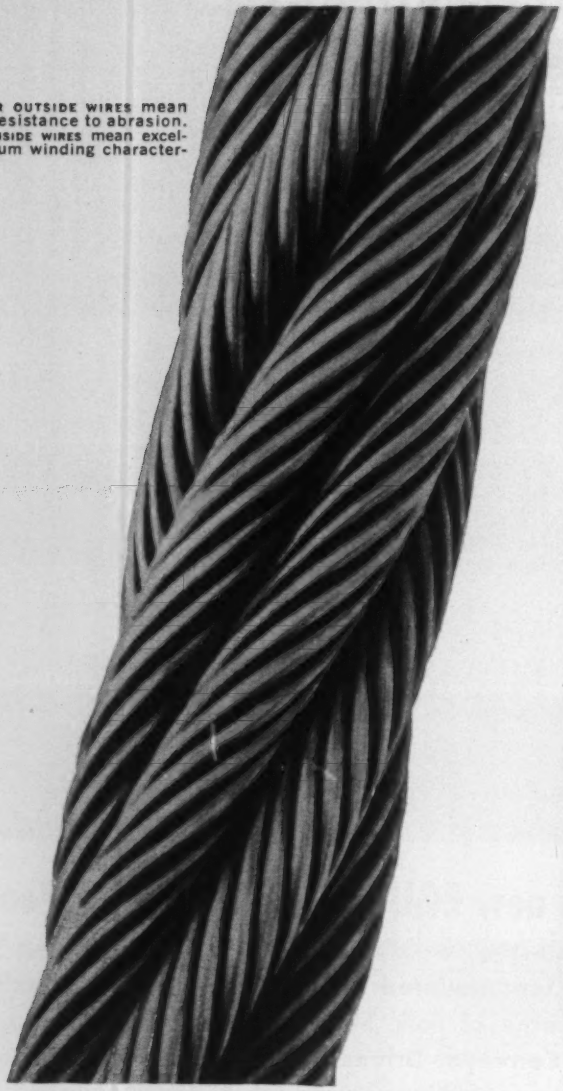
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

FALK

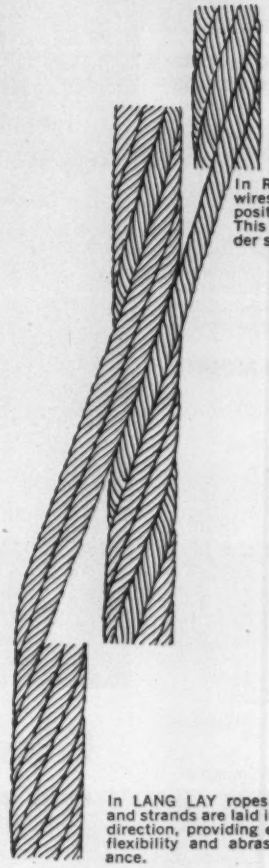
a good name in industry

Representatives and Distributors in most principal cities

FALK is a registered trademark



HEAVIER OUTSIDE WIRES mean great resistance to abrasion. FINER INSIDE WIRES mean excellent drum winding characteristics.



In REGULAR LAY ropes the wires are laid in a direction opposite to the lay of the strands. This provides stability even under severe operating conditions.

In LANG LAY ropes the wires and strands are laid in the same direction, providing exceptional flexibility and abrasion resistance.

Two ropes in one! Roebling Herringbone® Wire Rope is designed and made to wear better, work better, last longer than you can possibly imagine . . . unless you've tried it yourself!

Herringbone combines two pairs of Lang Lay strands with one pair of regular lay strands to give you maximum flexibility, good stability, mighty strength. Call your Roebling Distributor — or write for details to Roebling's Wire Rope Division, Trenton 2, N. J.

HERRINGBONE WIRE ROPE

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

High strength aluminum castings without heat treatment:

TENZALOY
THE SELF-AGING ALUMINUM ALLOY

Tenzaloy is a corrosion resistant aluminum alloy that ages at room temperatures, delivers high strength properties without costly solution treating, quenching, and artificial aging. No special foundry techniques are required; no fluxes. Castability is excellent with sand cast and plaster molds, and many permanent molds. Tenzaloy castings have superior machinability, take a brilliant polish, anodize clear white. Write for TENZALOY Bulletin No. 103 to: Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, N. Y., or call your nearest Federated sales office.

This transmission shift housing is one of several truck engine parts now cast of Tenzaloy for high strength without weight.

ASARCO

AMERICAN SMELTING AND REFINING COMPANY

FEDERATED METALS DIVISION

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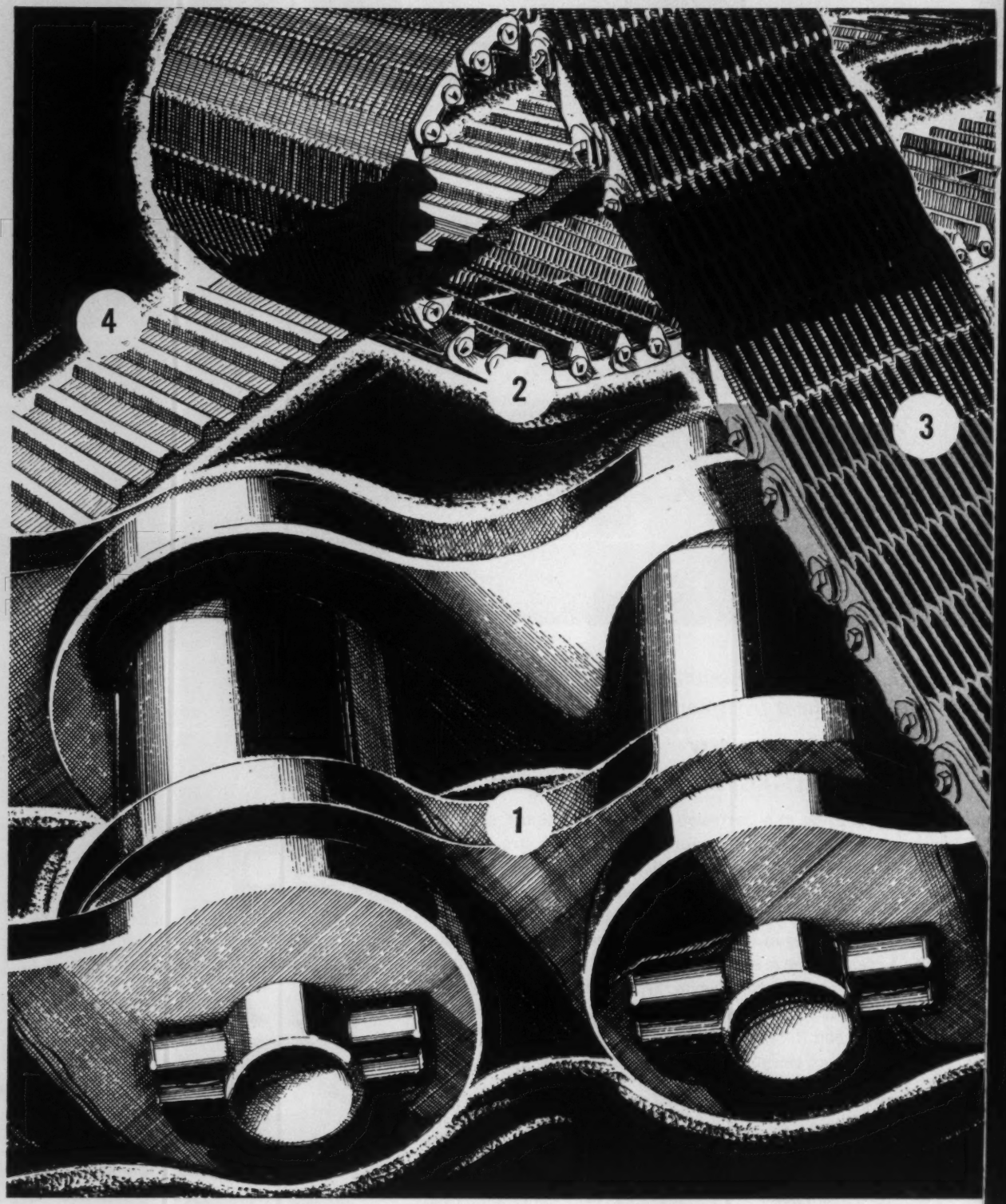
Whiting: Whiting 826
Chicago: Essex 5-5000

IN CANADA: Federated Metals Canada, Ltd.
Toronto, Ont., 1110 Birchmount Rd., Scarborough, Phone: Plymouth 73246

Montreal, P.Q., 1400 Norman St., Lachine, Phone: Melrose 7-3591



ONLY MORSE OFFERS ALL 4

1 ROLLER CHAIN

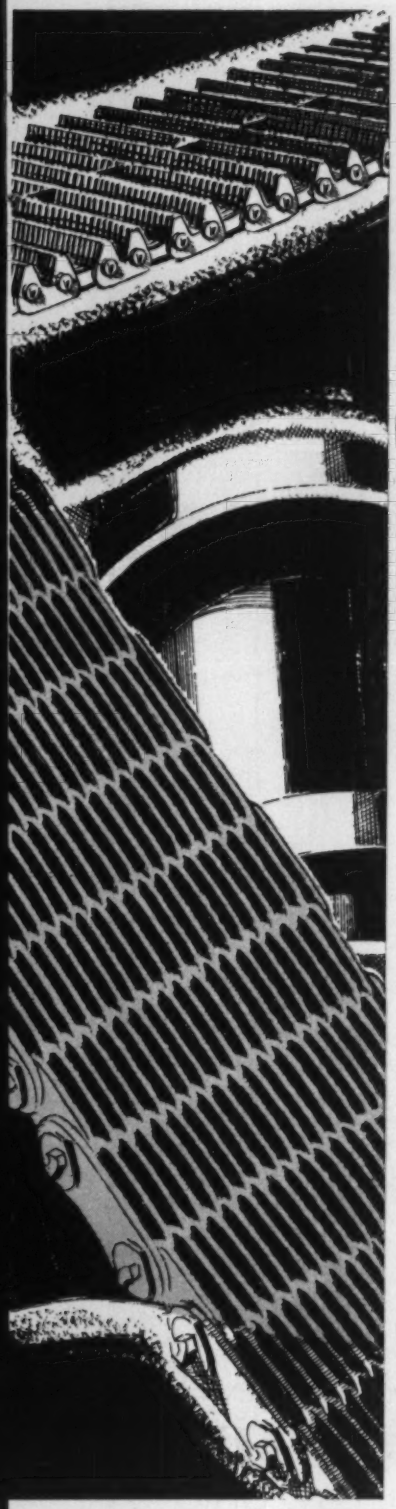
For low- and medium-speed applications. Precision-finished, specially treated to withstand shock and fatigue . . . lasts longer.

2 SILENT CHAIN

For smoother, quieter operation. Patented rocker joint operates with less friction, wear; runs cooler . . . has higher efficiency, longer life.

3 HY-VO® DRIVES

For extremely high speed and horsepower. Exclusive Morse drive travels up to 13,250 FPM, carries loads to 5,000 HP in minimum space.



Only Morse offers all 4... only Morse can offer

An objective look at your industrial-drive problems

Roller Chain, Silent Chain, Hy-Vo Drives and "Timing" Belts...Morse offers them all: Morse has no axe to grind for any one of them

Puzzled by conflicting recommendations on your industrial-drive problem? Then before you leap, call in Morse for a look. Nobody can give you a more *impartial* analysis of your problem, because only Morse makes *all four* of these basic drives. Moreover, Morse assumes full responsibility for your complete drive.

Roller Chain, Silent Chain, Hy-Vo® Drives and "Timing"® Belts: each is tailored to carry a specific load, run at a certain speed, operate under given conditions. Each drive is built to Morse's same high quality standards. So our recommendation can be influenced *only* by what is best for your application.

High-Endurance Roller Chain, for instance, is reserved for the toughest jobs. Made by a special process, Morse H-E has a 95% higher endurance limit when subjected to repeated high cyclic loading. It costs about 10% more, but Morse H-E outlasts ordinary chain by up to 5 to 1.

Single drive or complete power train, the principle is the same: It pays to deal with Morse. Contact your Morse distributor today—he's listed in the Yellow Pages. Or write us direct.

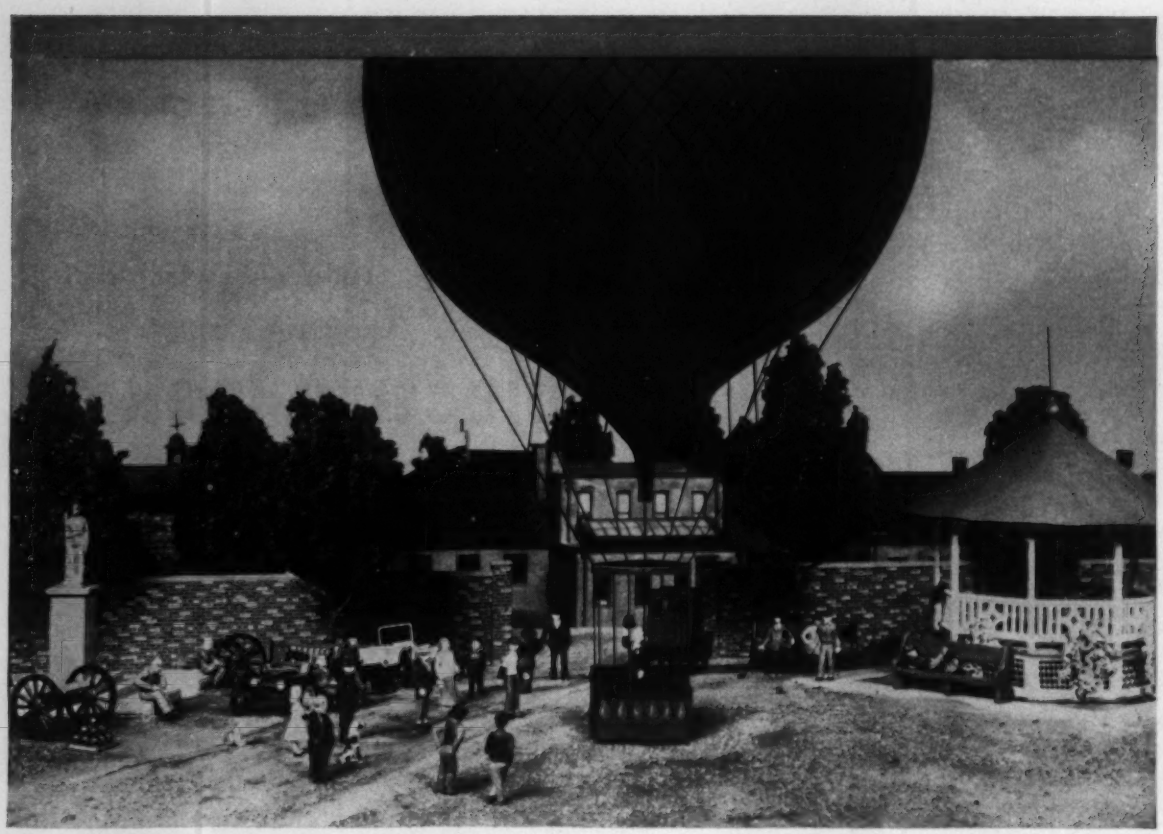
MORSE CHAIN COMPANY, Dept. 2-70, ITHACA, NEW YORK. Export Sales: Borg-Warner International, Chicago 3, Illinois. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ontario.

4 "TIMING"® BELTS

For lightweight, lubrication-free operation. No slip, no stretch for service life; speeds from 0 to 16,000 FPM, loads from 1/100 to 600 HP.

MORSE B-W

A BORG-WARNER INDUSTRY



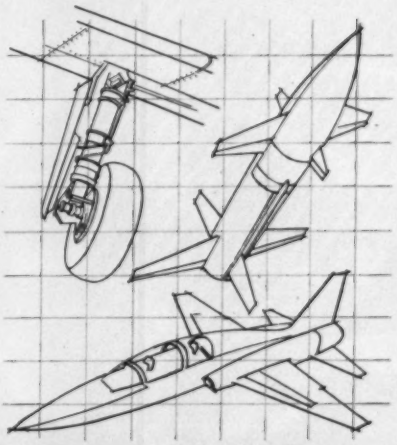
Are you up in the air over tubing sources?

If you have ballooning production problems, consider these important facts. OSTUCO Tubing is always the exact tubing you need for your product because OSTUCO Tubing is CUSTOM MADE for your product. Your order is manufactured to your own specifications to produce steel tubing especially for your application — the precise grade, analysis, size, shape, special anneal and tolerances best suited to your needs.

Ohio Seamless Tube produces both seamless and electric welded steel tubing — is prepared to form many finished or semi-finished tubular parts to your designs.

To get the most from your next steel tubing order, use Custom Made OSTUCO Tubing. Contact your nearest Ohio Seamless representative, or send part drawings to the plant at Shelby, Ohio — Birthplace of the Seamless Steel Tube Industry in America.

A-3449A



Model illustrated built to 3.5 mm scale.

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CANADA: Railway & Power Engr. Corp., Ltd. • EXPORT: Copperweld Steel International Company, 225 Broadway, New York 7, New York

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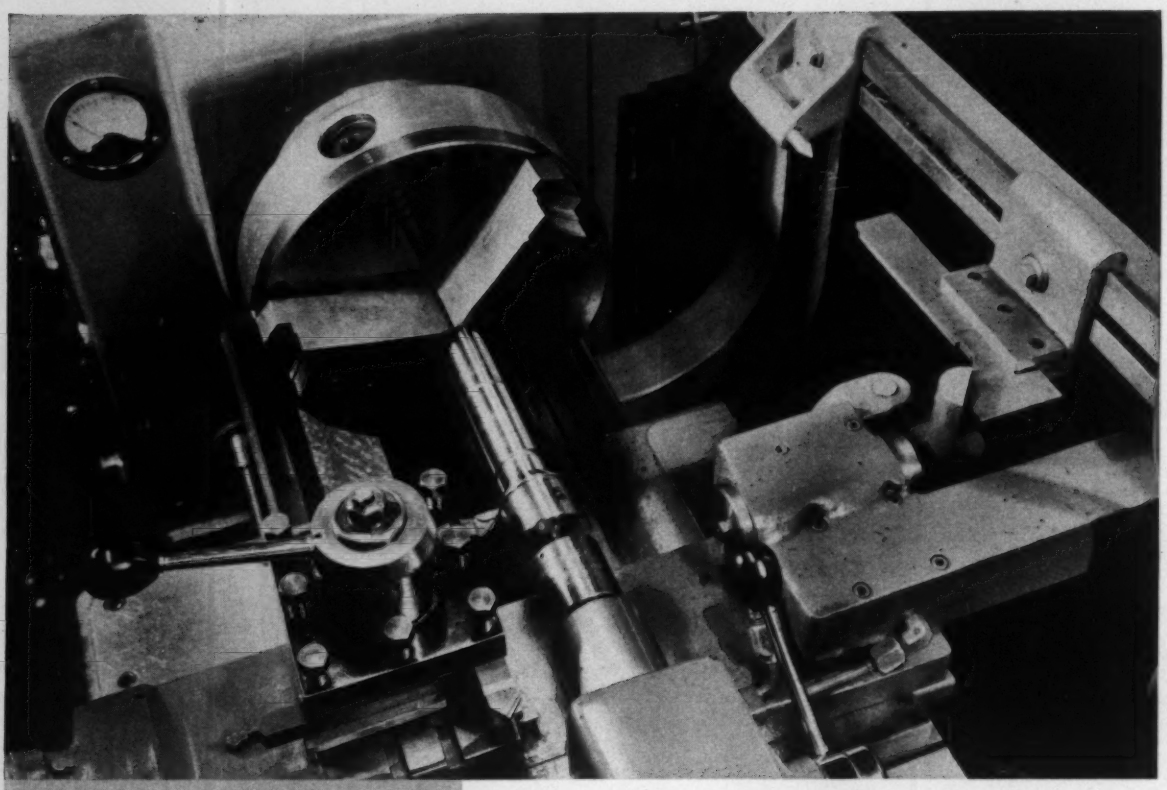
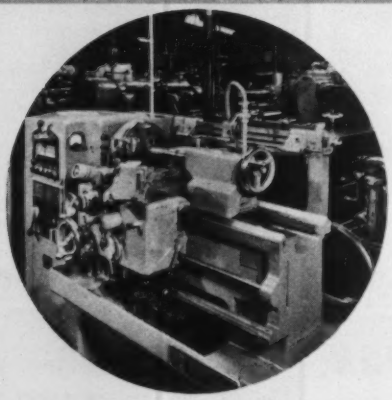


EXCELLENT *for high production*

. . . says Indiana Gear Works of LODGE & SHIPLEY 1307 Hi-Turn 45° COPYMATIC



If you think production turning requires a big, costly tracing lathe to assure fine part finish, long tool life and close tolerances . . . here's a new slant on the subject.

The 1307 (10″) Hi-Turn 45° COPYMATIC Lathe provides output, accuracy and versatility formerly available only from larger, far more expensive automatic lathes. As a matter of fact, users report these tracer-controlled lathes easily outperform lathes costing twice as much.

Among many Lodge & Shipley Lathes, at Indiana Gear Works, Indianapolis, you'll find Hi-Turn COPYMATICS which have earned a reputation "excellent for high production."

Especially designed for turning, boring and facing the Hi-Turn Lathes eliminate details unessential to production turning operations and give you capacity, accuracy and speed never before available at such low cost. For complete details, write:

The Lodge & Shipley Co., 3070 Colerain Ave.
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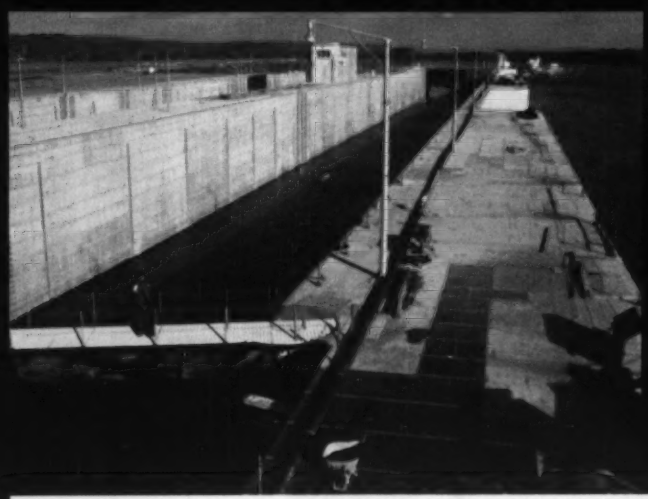
. . . more than ever before, your LODGE-*ical choice . . .*

Lodge & Shipley

SEE OUR CATALOG IN SWEET'S



"T-1" Steel saves 289 tons of weight in 16 lock gates

This is a story about how the tremendous strength of USS "T-1" Steel was utilized to save 289 tons of weight in the lock gates at the new Greenup, Kentucky and Markland, Indiana locks and dams on the Ohio River. Each lock gate has five diagonal braces that were designed for USS "T-1" Constructional Alloy Steel. At Greenup, it was estimated that 64 tons of "T-1" Steel did the work of 213 tons of carbon steel in eight gates. At Markland, 60 tons of "T-1" Steel were used instead of 200 tons of carbon steel to do the same job.

The diagonal units provide the supports which are absolutely essential to brace the gates. Each diagonal is a flat bar 8 inches wide by 1½ inches thick and about 73 feet long and weighs around 3,200 pounds. Toward the center of the diagonal is a turnbuckle used to adjust tension. By using USS "T-1" Steel, which has a minimum yield strength of 100,000 psi, both the size and weight of the diagonals were greatly reduced while retaining an ample factor of safety.

Lower costs. Reduction in weight because of the use of USS "T-1" Steel meant lower overall material costs, reduced shipping costs by more than one third, and decreased handling and erection costs.

USS "T-1" Steel for hoists. Four hoists for the emergency gates at Greenup locks and dam were also built of USS "T-1" Steel by McNally Pittsburg Mfg. Co., Pittsburg, Kansas. The structures are girder sections about 25 feet long and 41 inches deep. Flanges are 20 inches wide by 2½ inches thick. The webs are 36 inches deep by 1¼ inches thick. All were fabricated from "T-1" Steel plates. Each girder weighs about 12,000 pounds.

The new locks and dam on the Ohio River at Greenup, Kentucky were built under supervision of Huntington, W. Va. District, U. S. Army Corps of Engineers. A similar set of locks at Markland, Indiana was built under the Louisville District, U. S. Army Corps of Engineers. Gates fabricated by Nashville Bridge Company.

Other uses of USS "T-1" Steel in construction. Wherever great strength is needed with least weight, such as in bridges, TV towers, pressure vessels, and high pressure penstocks, USS "T-1" Steel offers many advantages. And for big construction machinery, "T-1" Steel is unsurpassed because of its strength, high resistance to impact abrasion, and weldability. For complete information, write for our "T-1" book. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and "T-1" are registered trademarks

This mark tells you a product is made of modern, dependable Steel.

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
National Tube – Pittsburgh
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
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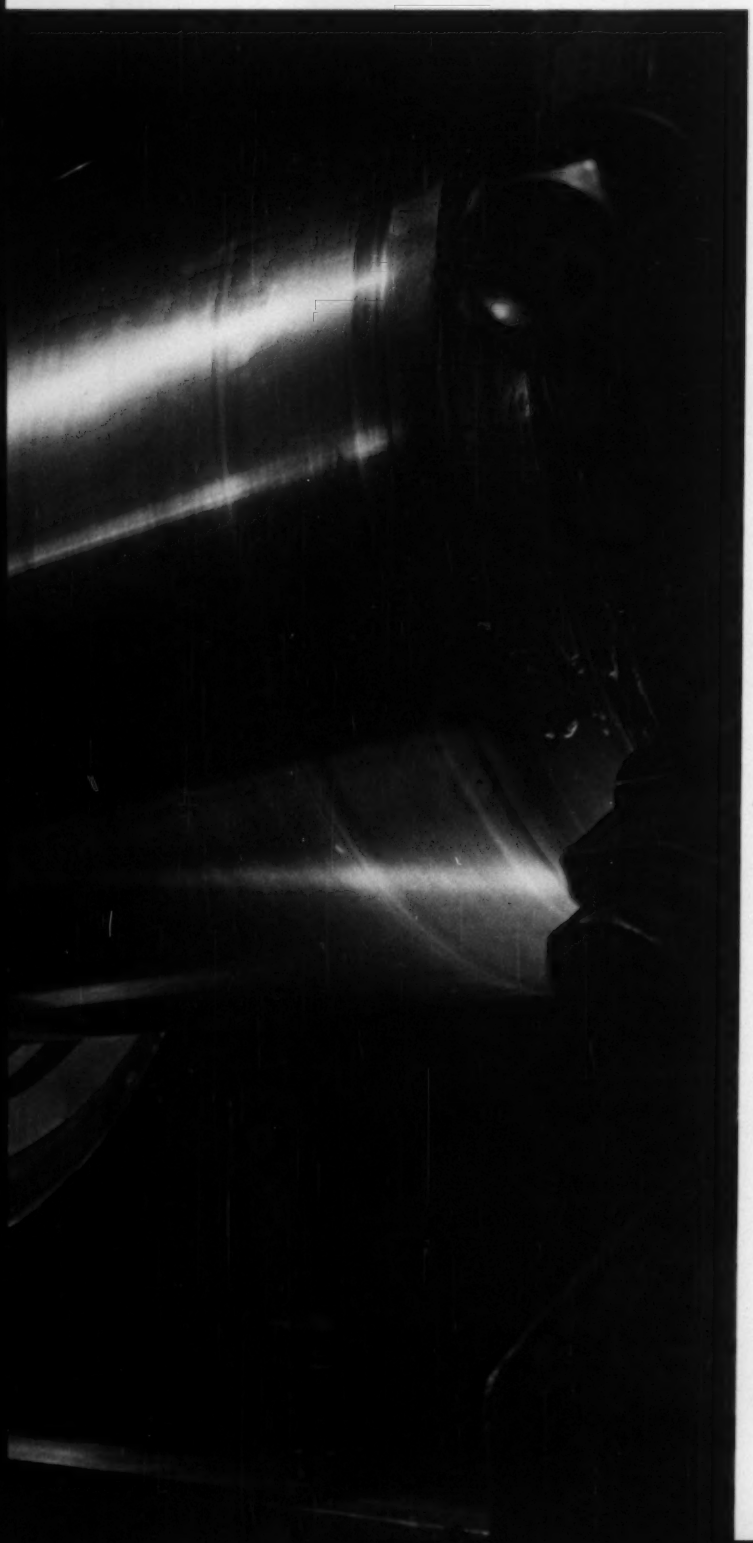
United States Steel

Down go back-up roll costs with

USS Quality Forged Sleeves



PICTURED ABOVE is James S. Rennick, a metallurgist with twenty years' experience in the Forgings Division of U. S. Steel. Jim specifies composition, heat treatment, and other processing procedures essential to the production of assemblies as shown in the main picture—a back-up roll that will be used in the cold reduction tin mill at U. S. Steel's Gary, Indiana plant.

This job points up a curious situation: U. S. Steel is one of the country's leading manufacturers of rolls, and also one of the biggest *users* of rolls . . . a double reason to perfect their performance and reduce their cost . . . just as we did here.

We had to replace a worn, cast steel back-up roll. Rather than replace the entire roll, we machined the face of the roll and shrunk on a *forged* steel sleeve. For back-up rolls like this one, 42" O.D. and larger, this method of sleeving is much less expensive than buying a complete new roll. One arbor can be used for several forged sleeves. A forged sleeve has a hard, wear-resistant surface and is highly resistant to spalling.

Also, the sleeve is purposely produced with a softer bore to develop a desirable stress pattern, and to provide maximum gripping between the arbor and sleeve after assembly.

There is a good possibility that we can help reduce *your* roll costs. Write or call the United States Steel Office nearest you, or United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
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Hendrick perforated metal

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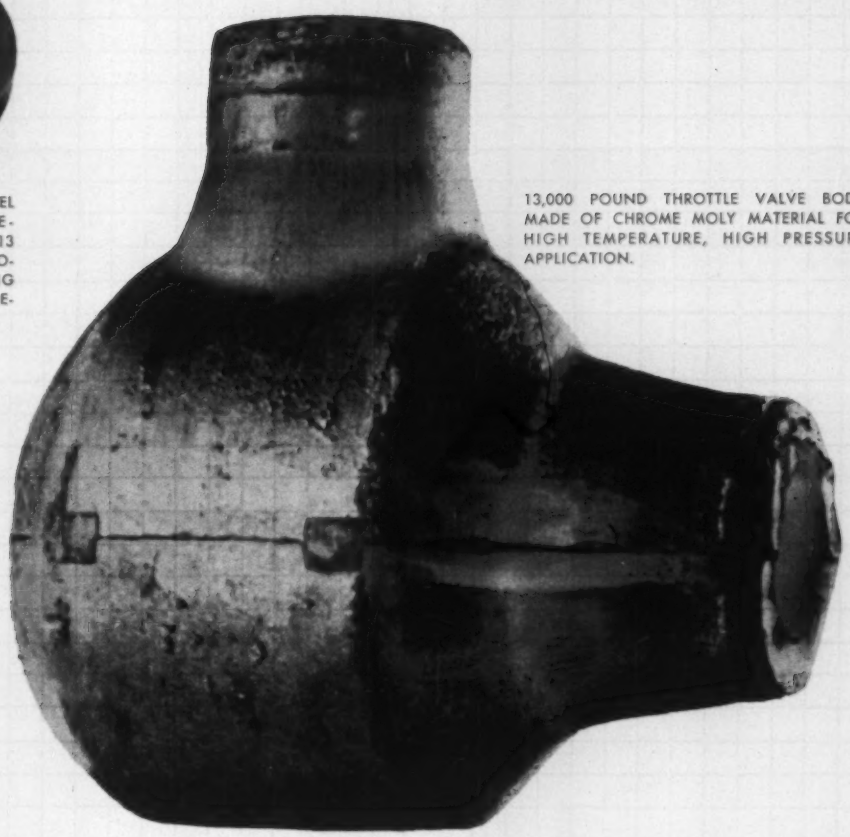
JET ENGINE TURBINE WHEEL MADE OF A-286 MATERIAL WEIGHING ABOUT 13 POUNDS—FILLS ONE OF TODAY'S MOST DEMANDING APPLICATIONS FOR A PRECISION MEMBER.



13,000 POUND THROTTLE VALVE BODY MADE OF CHROME MOLY MATERIAL FOR HIGH TEMPERATURE, HIGH PRESSURE APPLICATION.

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Cameron forgings are not like other forgings. In the tradition-bound world of metal working they possess new properties, better quality and unusual shapes. They have opened new design vistas when high stress, high temperature or large intricate components were a concern. In less demanding applications also, benefits have made their appearance in the form of easier machining, less fabrication and geater strength, resulting in less material and lighter weight.

Cameron forging technique requires a complete operation from molten steel to final inspection. Presses, furnaces and auxiliary equipment of our own design give complete quality control and independence in production schedules.

If Ferrous forging design, produceability or purchase is your responsibility and unusual demands—economic or physical are your problem, write, call (Houston OVerland 6-5511) or come by.

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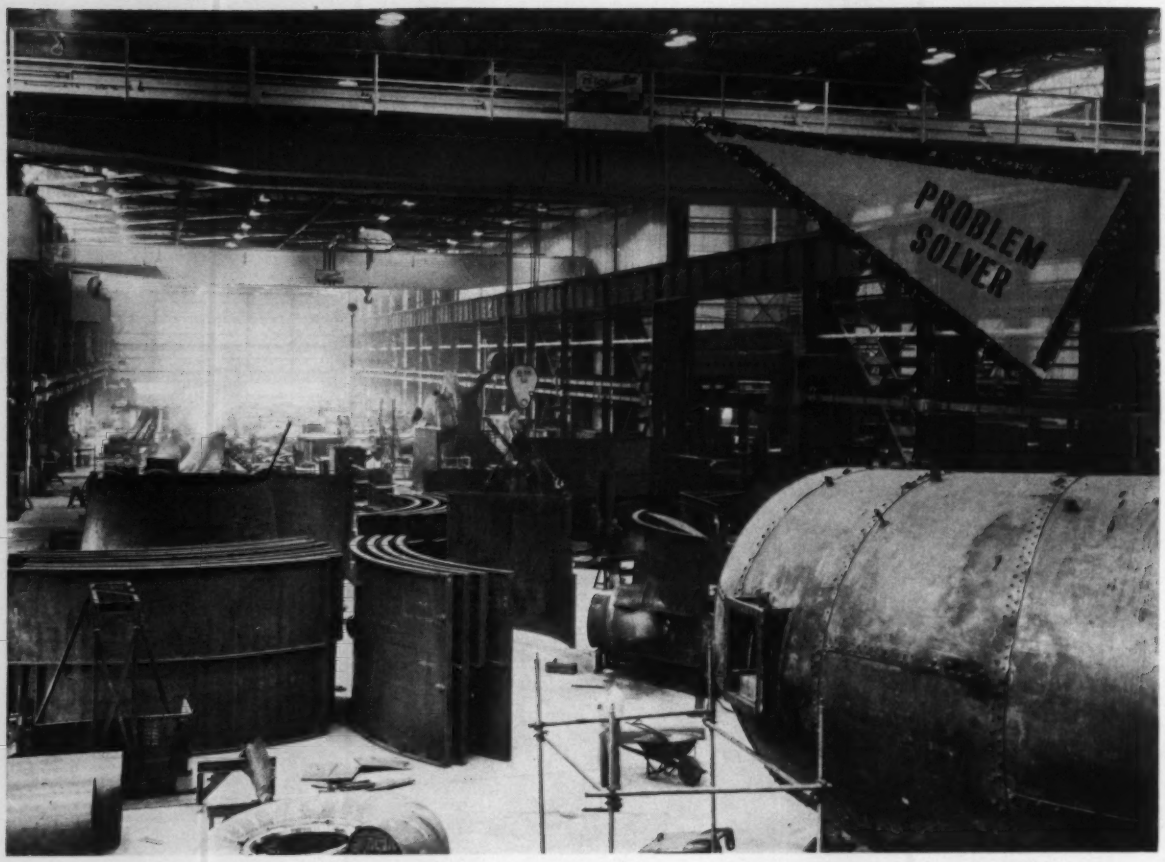
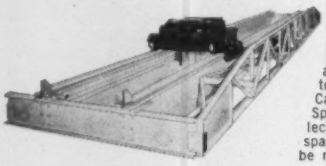
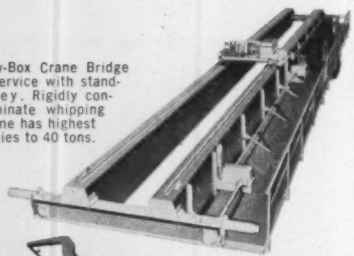


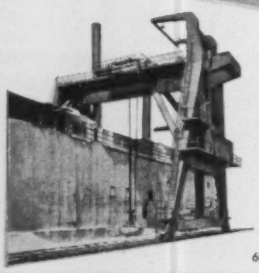
Production gets a multiple-shift lift from Shaw-Box® Cranes



Series "D" Shaw-Box Crane. For average industrial service. Components are mass produced to permit lower prices. Capacities to 20 tons. Spans to 80 feet. Selection of type, size, span, and control can be made from a catalog.



Type "SC" Shaw-Box Crane Bridge for heavy duty service with standard "SC" trolley. Rigidly constructed to eliminate whipping and skewing. Crane has highest hook lift. Capacities to 40 tons.



Shaw-Box Bucket Magnet Crane. This type has special advantages in steel mill services. Shaw-Box builds cranes of every type in every capacity to 500 tons.

60 D-1

At York, Pa. Allis-Chalmers Manufacturing Company engineers the unusual in hydrodynamics. Giant hydraulic turbines and their accessory water control equipment are designed and produced here.

Two 25-ton Shaw-Box Cranes help solve some of the tough handling problems in Plant No. 2. They carry steel plates and castings to and around in the fabricating area for layout and processing into subassemblies of draft tube liners, spiral casings, pit liners, and special products.

Multiple shifts are normally working at Plant No. 2. The cranes operate under diverse conditions. At one moment, each may be handling a piece that's too heavy for a man. Then both cranes may work together at their combined capacities. Clearing the largest assemblies is no problem for these low headroom cranes.

Shaw-Box Cranes are solving overhead load handling problems for all industry. Whatever type and capacity you require, Shaw-Box will engineer and build your crane to give the utmost in performance, economy, and safety. Your inquiry is invited.

MAXWELL MANNING & MOORE INC. TRADE MARK

SHAW-BOX CRANES

A Product of

MANNING, MAXWELL & MOORE, INC.

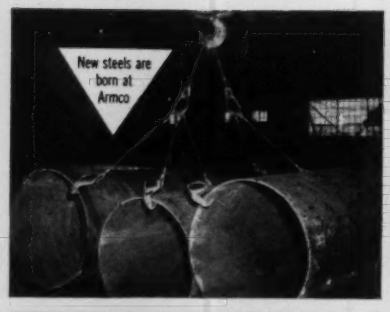
Shaw-Box Crane & Hoist Division • Muskegon, Michigan

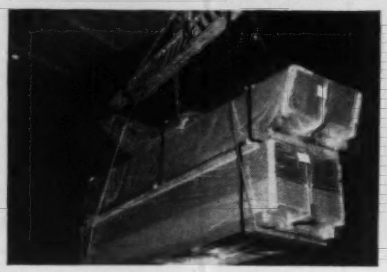
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

BLAW-KNOX

Blaw-Knox designs and builds a full range of continuous, semi-continuous and single stand reversing hot strip mills. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, sheet and strip processing equipment, electrolytic tinning, annealing, and galvanizing lines, seamless pipe and tube mills, draw benches, and cold draw equipment, Blaw-Knox Medart cold finishing equipment, iron, alloy iron and steel rolls, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings. Blaw-Knox Company, Foundry and Mill Machinery Division, Blaw-Knox Building, 300 Sixth Ave., Pittsburgh 22, Pa.

56-inch semi-continuous hot strip mill.





Tuffy has the right answers for every sling need

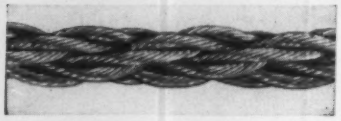
These three shots of Tuffy slings at work just begin to suggest the thousands of different jobs Tuffy does in hundreds of industries.

Tuffy slings, hoist lines and special-purpose wire ropes are tailored to every type use, every weight and shape of load, every set of working conditions.

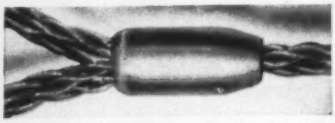
How well do they do the job? Quoting a steel company official: "We are getting double the service life from our 1¼" 9-part machine braided Tuffy slings as we did from 6 x 37 rope type slings."

That's typical of many testimonials that praise Tuffy's combination of better performance, greater safety and longer service life you get from Tuffy products.

Why Tuffy serves you better and saves you money



Tuffy's Exclusive Fabric combines extra strength and extra flexibility to give you ultimate sling construction. It makes knotting and kinking next to impossible. If a kink should occur, it's easily smoothed out, leaving no permanent damage.



Pressed-On Streamlined Metal Ferrule gives the tucked eye splice 100% of fabric strength. It's applied under tremendous hydraulic pressure. Streamlining eliminates snags and projections that might injure hands or arms.

Get in Touch with Your Tuffy Distributor

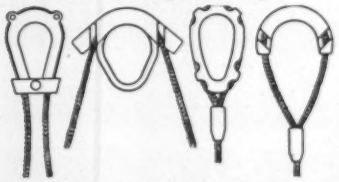
Whether your sling jobs call for machine-braided Tuffy slings or the new line of Union 6- and 8-part hand-braided slings, your Tuffy distributor can supply all your needs. His experience (and the counseling service of Union's branch office or factory staff) are yours to call on at any time. Look up your Tuffy distributor in the Yellow Pages.

Tuffy® Tips —on safe use of Slings and Hoist Lines

How Much Lifting Should Be Done by Muscles?

Individual differences between workers make this a hard question to answer categorically. For a rule of thumb: United States Department of Labor recommends men should handle no more than 50 pounds; women no more than 25 pounds. Of course this is for men and women of average size and height, in normally good physical condition. To remove all doubt, mechanical lifting and hoisting equipment should be used for all loads not comfortably lifted by muscles.

Use the Right Fittings



Proper fittings can give slings added safety and service life. The sling eye is usually the point of greatest wear in load handling. The proper fitting acts as a shield to take the brunt of this wear. Shown above are some of the standard and advance type fittings. Left to right: (1) *Equalizing Thimble* permits adjustment of the sling leg lengths so irregular loads may be handled on an even keel. (2) *Newco Sling Bridle* will not slip when handling unbalanced loads. (3) *Newco Slip-Thru Thimble* allows passage of an identical thimble through its eye when a regular sling is used as a choker sling. (4) *Newco Slip-On Thimble* eliminates flattening or pulling together of eyes under heavy loads; can be attached or removed in seconds.

FREE!
New Tuffy
Sling Handbook

All about slings from A to Z, including types, dimensions and rated loads. Address **Union Wire Rope Corporation, 2160 Manchester Ave., Kansas City 26, Missouri.** Specialists in high carbon wire, wire rope, braided wire fabric, and stress relieved wire and strand.

4

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Your productivity is his business

This man specializes in cutting seconds from the time it takes to insert a screw or tighten a nut on the modern assembly line. He knows that bits of time and money saved—multiplied by production volume—result in increased productivity.

He's the Gardner-Denver Application Specialist—a good right hand to tool engineers and methods engineers. He starts with a single air motor, for example, and using a variety of handles, reduction gears, clutches and attachments as "building blocks," he assembles any one of 1173 specific air tools. Each Gardner-Denver air tool—screw driver, nut setter, drill or wrench—is engineered to solve a specific production problem for you. Call your Gardner-Denver Air Tool Specialist for a survey of your production lines. Remember: your productivity is his business.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

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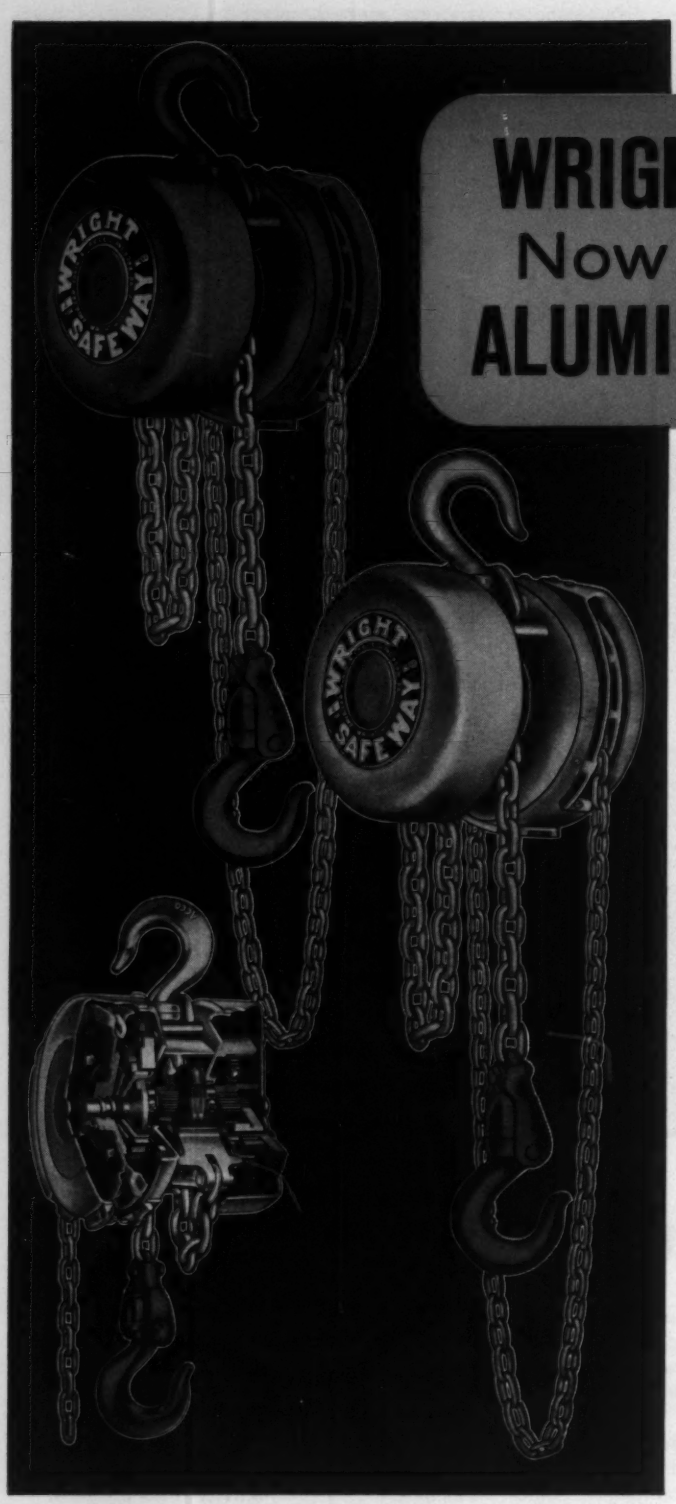

WRIGHT SAFEWAYS
Now Available in
ALUMINUM or STEEL

• Take the finest hand hoist ever made for simplicity of design and sturdiness of construction...add to it new external and internal parts of aluminum...and you have the WRIGHT Aluminum Safeway Hand Hoist. This hoist is made lighter and more easily portable, yet retains all the advantages of the original Safeway design. It features load-bearing parts of strong, shock-resistant steel. Aluminum replaces the heavy steel covers, chain guide and hand chain.

It is a self-lubricating hoist which keeps load chain, load wheel and gear train operating smoothly at all times. Gear train is enclosed in grease-tight chamber and stays lubricated for life. Load chain and load wheel are lubricated by wick-type oiler fed from refillable reservoir.

Two factory tests certify the accuracy, workmanship and rated load-carrying capacities of these new aluminum hoists. Every foot of load chain is proof-tested and every completed hoist is tested at 50% above rated capacity.

Available now in six models in a capacity range of ½ to 4 tons, WRIGHT Aluminum Safeway Hand Hoists offer these outstanding features:

GEAR TRAIN • Planetary system using modified involute stub tooth gear form with all gear teeth generated from solid steel blanks.

LOAD BRAKE • Weston type with uniform composition lining and silent pawl.

LOAD WHEEL • Ferrous alloy, reversible, with accurately formed pockets.

LOAD CHAIN • Electrically welded, has maximum wear resistance and ability to withstand extreme impact.

LOAD CHAIN GUIDE • Guides chain into load wheel and shrouds load sheave, protecting parts from falling dust.

BOTTOM HOOK • Nickel-chrome-molybdenum alloy steel. Rocks and swivels. Operates on a Timken thrust bearing.

Contact Your WRIGHT DISTRIBUTOR

Or write our York, Pa., office for DH-164 and DH-345 which give complete information about WRIGHT Safeway Hand Hoists made from aluminum and steel. Find out the advantages they offer you.

WRIGHT HOISTS

Wright Hoist Division • American Chain & Cable Company, Inc.

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Since 1948 many thousands of these Meehanite bearing housings have been produced by Otis Elevator Co., Ltd. for the railroads. They are made in type GM Meehanite and flame hardened.

UNIFORMITY... casting after casting

Meehanite's exclusive manufacturing process gives you positive assurance of always getting clean, sound castings with uniform structure and properties in all sections . . . in every casting . . . in every group of castings. This ability to control quality and uniformity saves you time and money in your shop and results in dependable performance in service.

Avoid the risk of hidden defects which cause high machining costs and casting rejects. Don't take a chance on bargain prices or so-called "equivalents." Specify Meehanite metal and be sure of obtaining castings that do the job better.

There are 30 types of Meehanite metal—each made to its own structural constitution and possessing its own combination of engineering properties. Why not have a field engineer from a Meehanite foundry help you select the one type that will most completely meet your design and service requirements. Check the Meehanite foundries listed below for the one nearest you. You'll like doing business with a Meehanite foundry.

Write today for your free single copy of the Meehanite Wall Chart. It contains complete specifications on many types of Meehanite.

MEEHANITE METAL

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Atlas Foundry Co., Detroit, Mich.
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Barnett Foundry & Machine Co., Irvington, N. J.
Casting Service Corp., LaPorte, Indiana and Bridgman, Michigan
Centrifugally Cast Products Div., The Shenango Furnace Co., Dover, Ohio
Compton Foundry, Compton, Calif.
The Cooper-Bessemer Corp., Mt. Vernon, Ohio and Grove City, Pa.
Crawford & Doherty Foundry Co., Portland, Ore.
Dayton Casting Co., Dayton, Ohio
Empire Foundry Co., Tulsa, Okla.
Florence Pipe Foundry & Machine Co., Florence, N. J.
Fulton Foundry & Machines Co., Inc., Cleveland, Ohio
General Foundry & Mfg., Flint, Mich.
Georgia Iron Works, Augusta, Ga.
Greenlee Foundries, Inc., Chicago, Ill.
Hamilton Foundry Inc., Hamilton, Ohio
Hardinge Co., Inc., York, Pa.
Johnstone Foundries, Inc., Grove City, Pa.
Kanawha Manufacturing Co., Charleston, W. Va.
Kennedy Van Saun Mfg. & Eng. Corp., Danville, Pa.
Lincoln Foundry Corp., Los Angeles, Calif.
Oil City Iron Works, Corsicana, Texas
Palmyra Foundry Co., Inc., Palmyra, N. J.
The Henry Perkins Co., Bridgewater, Mass.
Pohlman Foundry Co., Inc., Buffalo, N. Y.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ross-Meehan Foundries, Chattanooga, Tenn.
Sonith Foundries of FMC, Indianapolis, Ind.
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Vulcan Foundry Co., Oakland, Calif.
Washington Iron Works, Seattle, Wash.
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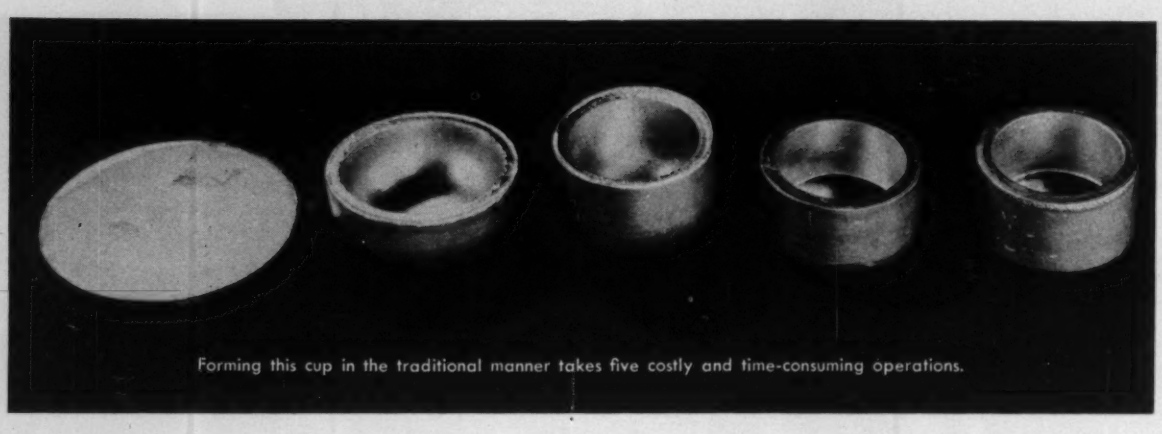
Otis Elevator Co., Ltd., Hamilton, Ontario

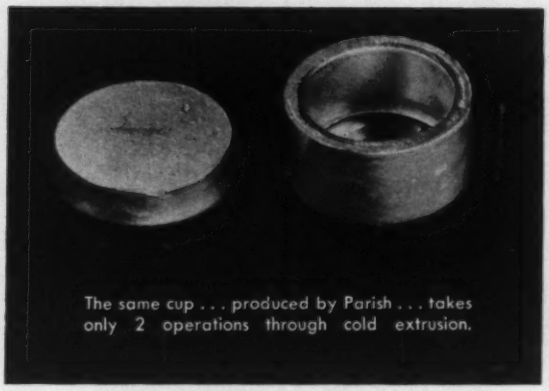
MEEHANITE METAL CORPORATION, NEW ROCHELLE, NEW YORK



Forming this cup in the traditional manner takes five costly and time-consuming operations.

Precise metal forming simplified

PARISH ingenuity speeds production, cuts cost



The same cup . . . produced by Parish . . . takes only 2 operations through cold extrusion.

Even at its new lower cost, the Parish part is more accurate than those produced by the old-fashioned 5-step forming process. The difference is Parish experience and ingenuity . . . the ability to recognize that there's a simpler, faster, cost-cutting way to turn out high quality production in volume.

Look at the benefits! By streamlining this operation from 5 stages down to 2 . . . with the aid of the latest high-impact presses . . . Parish engineers cut the cost and time for tooling, doubled the rate of production, and delivered the parts at a new low price.

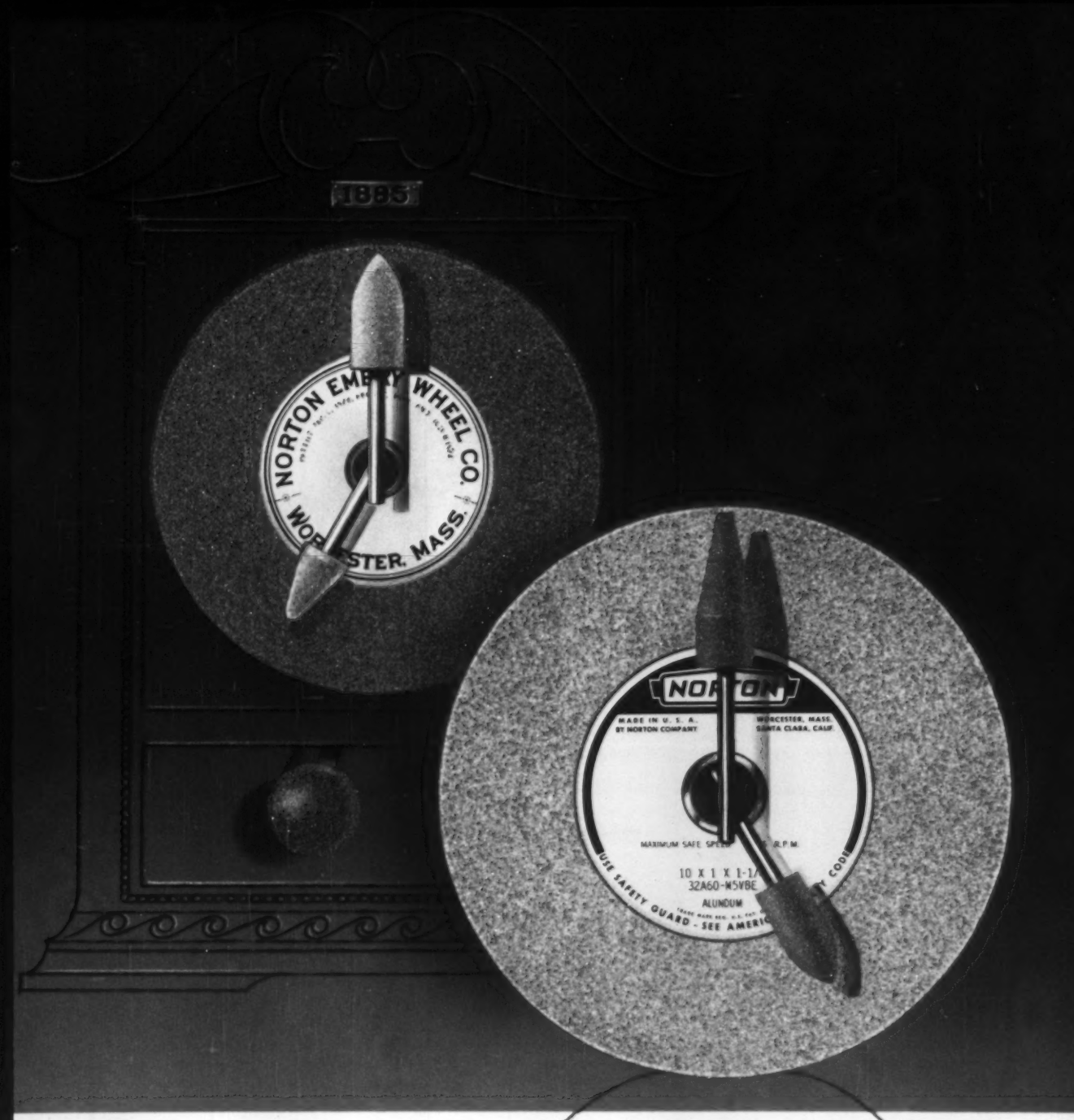
Parish facilities, ingenuity and skill may help you cut the cost of large and small parts requiring stamping, machining, heat-treating, welding, balancing and assembly.

Why not increase your margin of profit by writing Parish today? Your inquiry will receive prompt attention.

● **DANA PRODUCTS:** Transmissions • Universal Joints • Propeller Shafts • Axles • Torque Converters • Gear Boxes • Power Take-offs • Power Take-off Joints • Rail Car Drives • Railway Generator Drives • Stampings • Spicer and Auburn Clutches • Parish Frames • Spicer Frames • Forgings

P **PARISH** PRESSED STEEL

DANA Division of Dana Corporation / Reading, Penna.



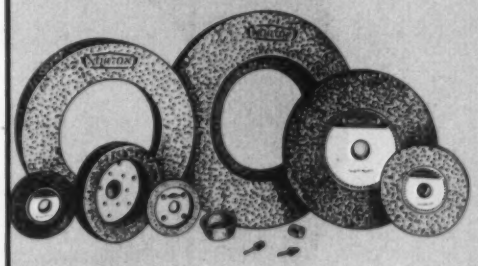
75 years... a lifetime of progress

The Norton story begins in the dim past, farther back than 1885. But it was in that year that a group of forward looking industrialists founded the Norton Emery Wheel Company in Worcester, Massachusetts.

Today, Norton Company looks forward with equal confidence to its continued growth under sound financing, progressive management and with loyal employees. And it looks back with pride upon 75 years of steady progress in developing and applying the world's largest line of abrasives to meet the needs of industry.

It's your Norton Man's

75th ANNIVERSARY, *too*



To say that "it's your Norton Man's 75th Anniversary, too," has nothing to do with his age. But it has a good deal to do with his qualifications as your production consultant. For the experience of Norton Company — since its founding in 1885 — is, in a very real sense, his own personal background.

For example, your Norton Man's thorough training at the Worcester Plant is based on the Company's 75 years of developing the world's largest line of abrasive products — including the widest range of grinding wheels, from mammoth pulpstones to miniature mounted wheels; discs and segments; abrasives for polishing, lapping, tumbling and pressure blasting.

Typical Norton Advancements

Norton was first to introduce all three bond types of diamond wheels, and now uses man-made as well as mined diamonds to meet today's broader needs . . . introduced NORBIDE® boron carbide, next to diamonds the hardest material ever made by man for commercial use . . . and the latest Norton advancement is the opening of another new five-acre plant, built for the sole purpose of using new, modern methods to manufacture resinoid bonded wheels, favorites among foundries and other users. Besides developing these and many other types of abrasive products, Norton has constantly improved grinding techniques throughout industry.

Your Norton Man's Heritage is this wealth of technical know-how gained by Norton in 75 years, backed by his own practical training and field experience. As your Abrasive Engineer, this combined background qualifies him to give you expert advice on the selection and use of grinding wheels. He'll supervise test runs of wheels in your plant and will give you every aid in bringing the lowest cost-per-piece to your production economy.

Nation-Wide Deliveries and Service

In the United States, Norton manufactures in Worcester, Mass., and Santa Clara, Cal. and maintains immense factory stocks plus warehouse stocks in five conveniently located cities. Norton distributors in 283 cities keep their stocks fully adequate to the needs of their areas. For prompt deliveries, helpful service, and contact with your Norton Man, call your Norton distributor.

NORTON
ABRASIVES

NORTON COMPANY • WORCESTER, MASS.

District Offices: Atlanta • Chicago* • Cleveland* • Detroit* • Hartford • Los Angeles Area (Huntington Park) Indianapolis • New York Area (Teterboro, N.J.) • Philadelphia* • Pittsburgh* • St. Louis

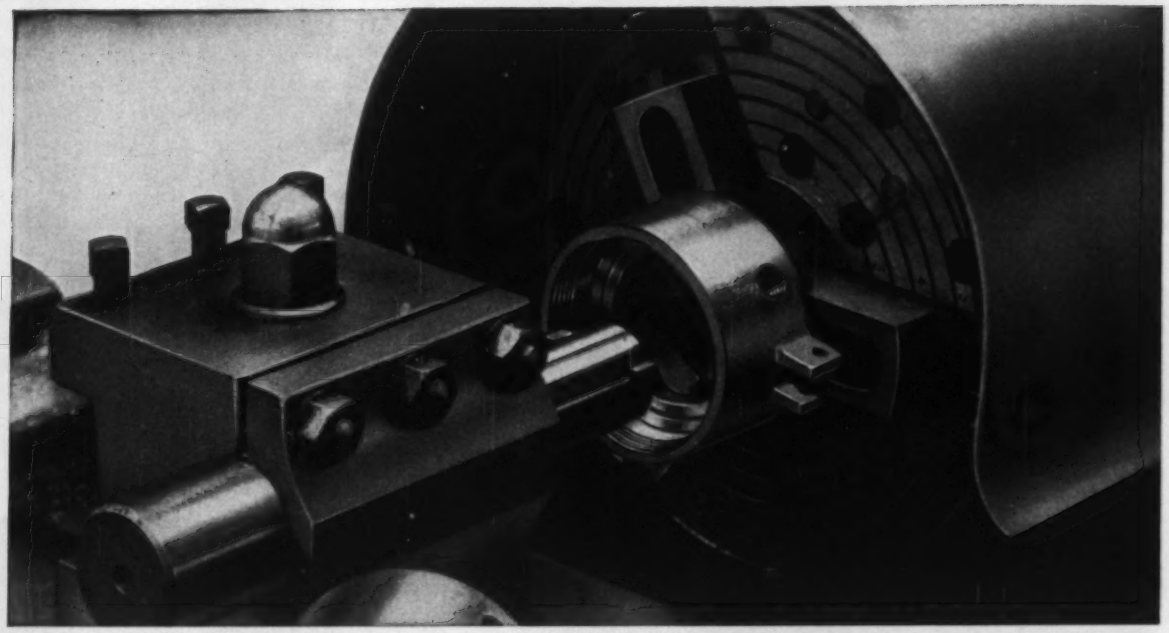
*Warehouse Facilities and Stocks at this location

BEHR-MANNING CO., Troy, N.Y. is a Division of Norton Company

75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

4-60



Threaded in just 6 seconds on a Gisholt CRI-DAN

Here's a good example of what you can do on a Gisholt CRI-DAN Threading Lathe—an internal thread, 2 3/16" diameter x 1/4" long, 12 t.p.i., cut in a phosphor-bronze bearing housing in just six seconds.

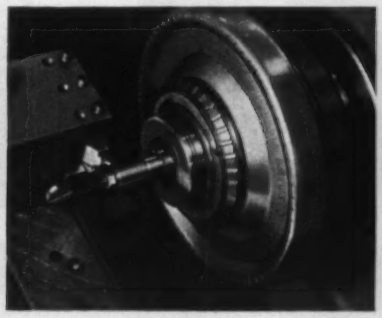
Speed and versatility obsolete other methods.

Note the other jobs shown—the variety of work and the fast threading times. Simple on a CRI-DAN—yet, each presented problems that could only be solved at high cost using any other method.

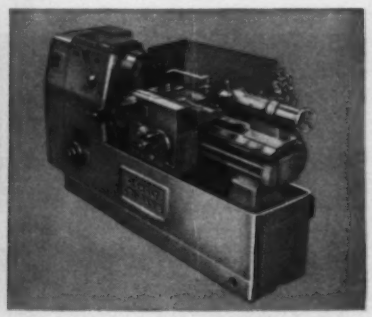
It's Cri-Dan for highest quality, lowest cost.

The jobs shown here prove that close tolerance and high-quality finish requirements are met easily on the CRI-DAN. The CRI-DAN method, using an inexpensive single-point carbide tool, is faster and less costly than thread grinding or thread milling.

20 seconds—Zoom operating sleeve for movie camera; aluminum; I.D. pilot dia. bored; tool indexed for threading a 2-start, .0625-pitch, .125"-lead, Class 4 16NS thread in the 1.610" center section.



15 seconds—spinning roller; stainless steel; 18 t.p.i. thread on 5/8" diameter for 7/8" length.



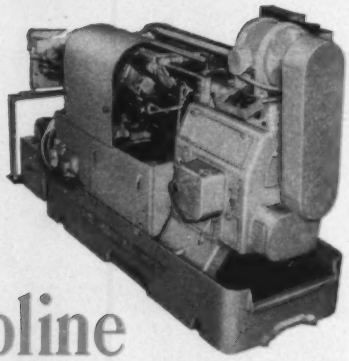
GET THE FACTS—NOW! Two models are available—both are capable of handling high-production work or a wide variety of short-run jobs. Change-over averages ten minutes. Write for our catalog—or ask your Gisholt Representative for complete details.

GISHOLT® MACHINE COMPANY
Madison 10, Wisconsin

Investigate Gisholt's Extended Payment and Leasing Plans

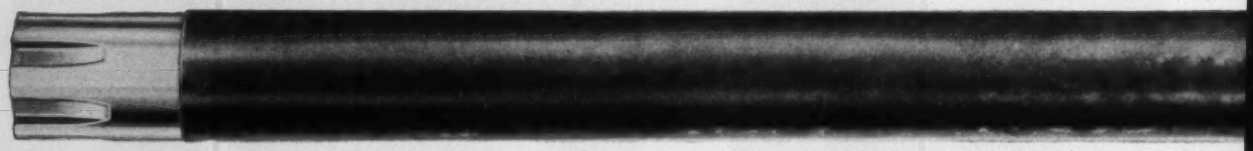
MMT-PE

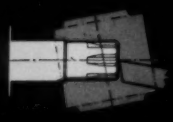
Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • *Factory-Rebuilt Machines with New-Machine Guarantee*



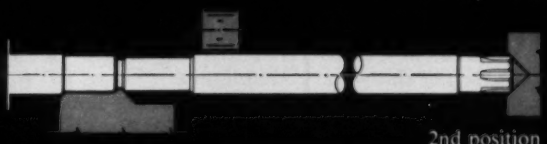
Acme-Gridley performs spline hobbing in a single set-up . . .

slashes ringer roll shaft production time 63%!

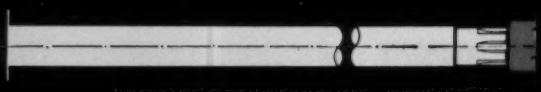




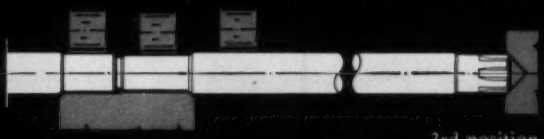
5th position
Hob Spline—Face Front (spindle clutch disengaged, spindle driven from hobbing attachment)



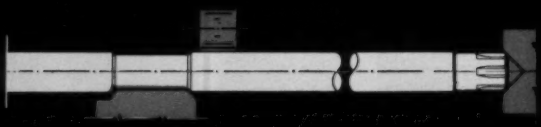
2nd position
Form Spline Dia. of Next Piece and Breakdown for Cut-off—Support



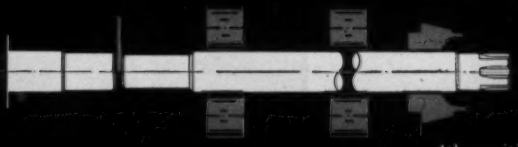
6th position
Feed Stock



3rd position
Shave Rear Dia. and Spline Dia.—Support



1st position
Form Rear Dia. Past Cut-off—Support



4th position
Support—Pick-up—Cut-off

6 Operations in 27.9 Seconds

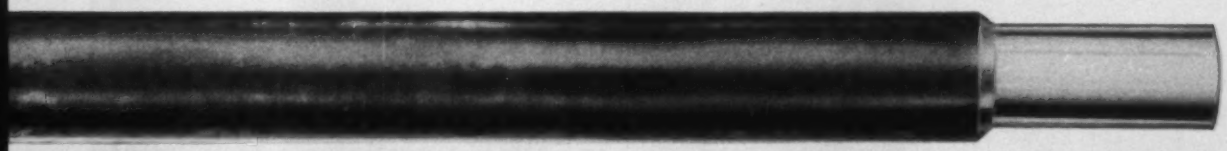
Here's how imaginative National Acme solutions to tough machining problems extend total machine capability and pay off in *tangible* production savings.

Spline hobbing is generally considered beyond automatic bar machine capability. Yet, an ingenious National Acme hobbing attachment . . . installed on an Acme-Gridley 1¼" RA-6 with modifications . . . lets a well-known manufacturer of ringer roll shafts do spline hobbing in the primary set-up; has cut per-piece production time 63%. In addition, a unique automatic feeding arrangement has drastically reduced stock-loading downtime.

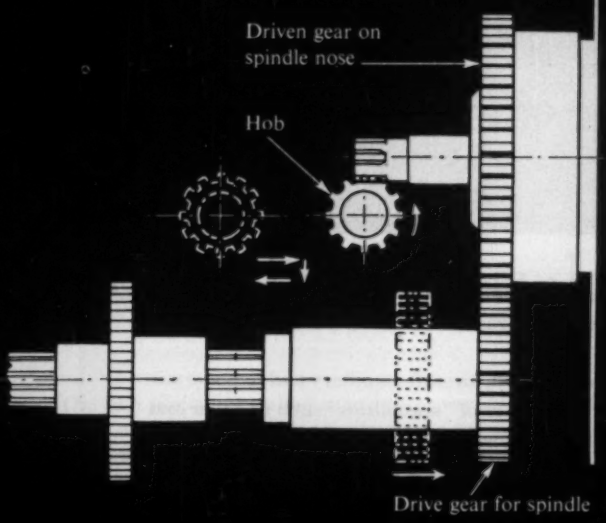
Special attachments like the spline hobber, plus such standard features as direct camming, independently operated toolslides, and a wide open tooling zone are the reason Acme-Gridley capability is limited by imagination only. No wonder cost-conscious manufacturers everywhere depend on Acme-Gridleys for higher mass production efficiency at lower cost. Detailed information on the world's most complete line of multiple and single-spindle automatic bar and chucking machines is yours for the asking. Call, write or wire.

National Acme's "Zone of Responsibility" includes all phases of cost reduction. Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by thousands of manufacturers . . . an "everyday" job for Acme-Gridleys. **Indirect Costs:** effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc. **Product Redesign:** teaming with your design group to take full advantage of Acme-Gridley's cost reducing capabilities. **Direct Material Costs:** our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems. **Make-or-Buy Reviews:** in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment. **Spot Modernization:** pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



Spline hobbing in the fifth position . . . a closer look



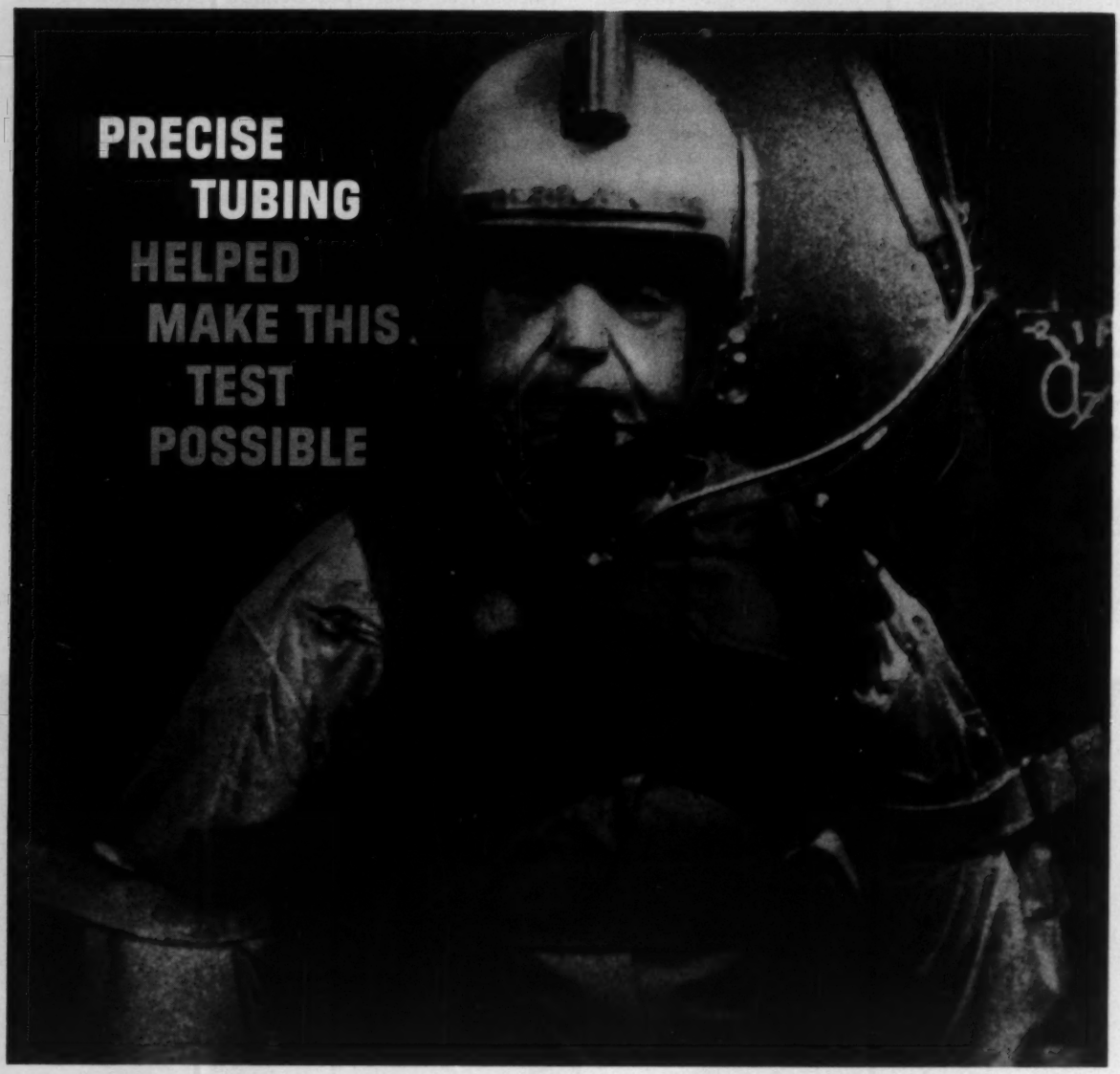
When the hobbing attachment advances, a gear on the attachment engages a gear on the spindle nose and drives the spindle at the required speed for hobbing.

MMT-PE
MODERN MACHINE TOOLS
PRODUCTION EFFICIENCY

National Acme

THE NATIONAL ACME COMPANY
189 E. 131st STREET
CLEVELAND 8, OHIO

Sales Offices: Newark 2, N. J., Chicago 6, Ill., Detroit 27, Mich.



That's a test pilot undergoing several "G's" in one of those human centrifuges. His life and the progress of future generations depend on the performance of many tubular parts built to rigid specifications, tight tolerances.

We make stainless steel and nickel tubing in mechanical, aircraft, capillary and hypodermic grades in sizes up to 1 inch OD—plus an amazing variety of "specialties" such as super and "exotic" alloys, glass-to-metal sealing alloys and clad metals.

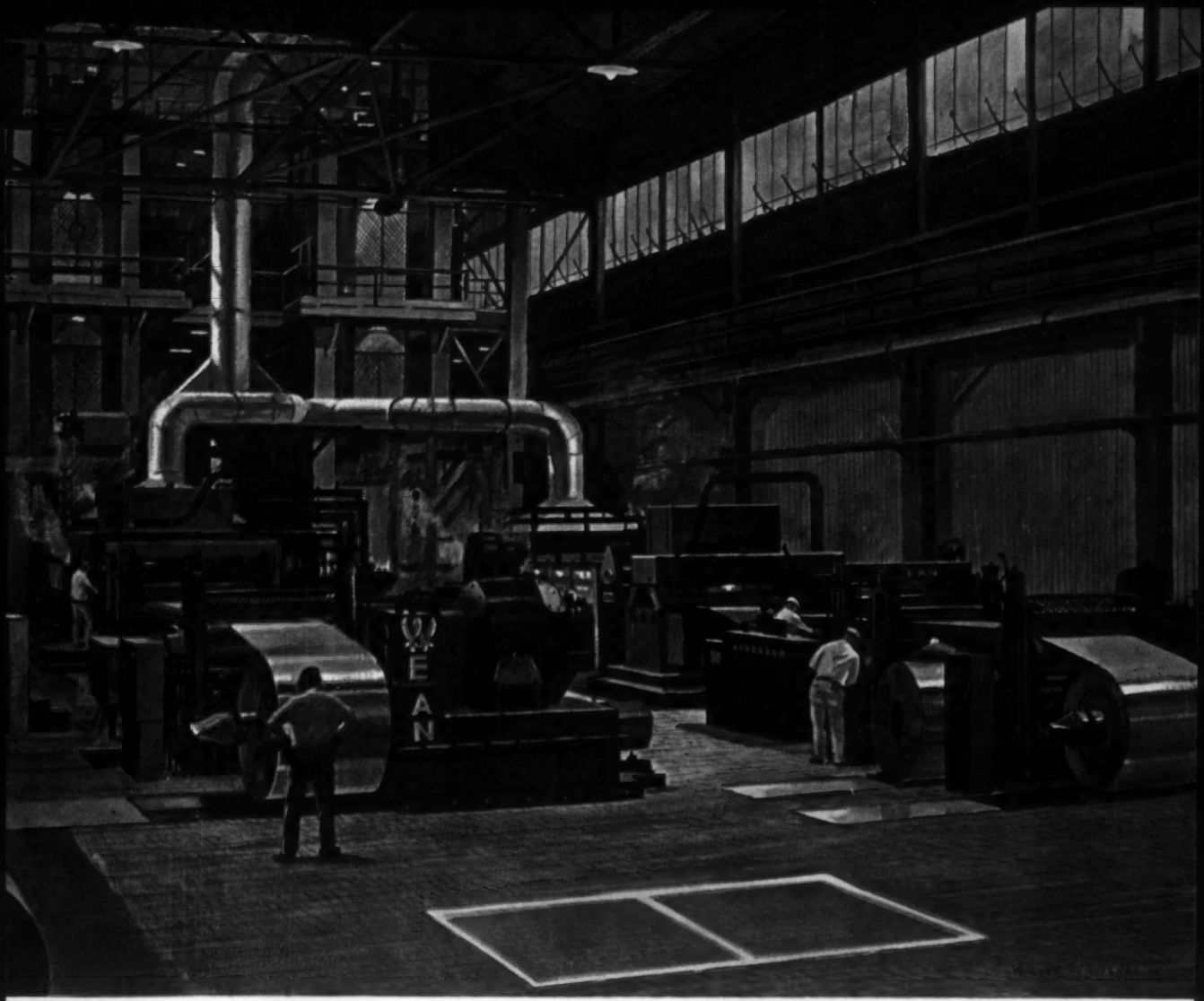
In addition, we produce a vast line of platinum products and chemicals that have been used by industry for over a century.

We are unique because of our ability to *work these metals to such tiny, precise forms.* Bulletin No. 12 describes our tubular products—Catalog No. 5 describes our platinum products. Write for them.

BISHOP

Tubular Products Division **J. BISHOP & CO.** *platinum works* 30 KING STREET, MALVERN, PENNA.

A JOHNSON MATTHEY ASSOCIATE "METALS FOR PRECISION AND PERFORMANCE"



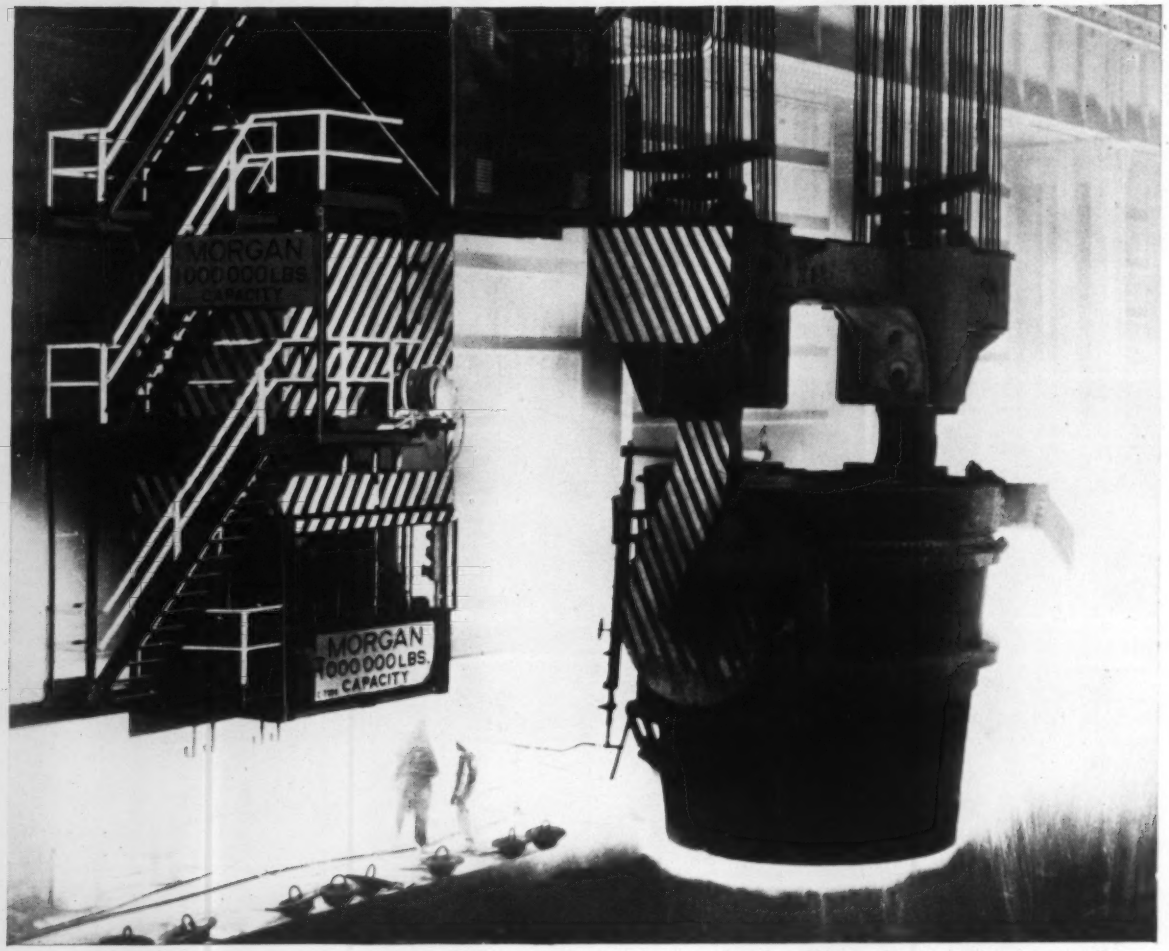
No. 5 and 6 continuous silicon annealing lines, Vandergrift plant, U. S. Steel Corporation

Wean, U.S. Steel and Silicon Annealing...

The two silicon annealing lines featured above—and a third line in an adjacent building—were recently installed at the Vandergrift plant of United States Steel. Precision-engineered by Wean Engineering Company, these new lines are designed to assure exact molecular consistency of the strip for the required electrical properties of grain-oriented silicon material.

U. S. Steel's silicon annealing lines are among the many continuous annealing lines designed by Wean for the American steel industry. Every major steel company in this country has used Wean continuous process equipment in supplying its customers' needs; many of these installations being specifically designed to satisfy unique requirements. Whether your production planning involves silicon annealing or some other type of continuous strip processing, Wean's experience and *creative engineering* can work for you.

THE WEAN ENGINEERING COMPANY, INC. · WARREN · OHIO



Repeated million-pound loads in the intense heat from 375 tons of molten steel, cause no spalling or deformation of Rollway Bearings.

1,122,000 Pounds Ride on 68 Rollway Bearings

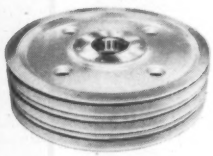
One of the largest in the world, this 500-ton Morgan-built ladle crane is Rollway equipped in many positions.

Sixty-eight maximum-type, solid-cylindrical bearings—mounted without inner races—lift and lower the 1,122,000-pound weight of the lifting beam, ladle hooks, ladle and white-hot steel.

Rollway Tru-Rol® type bearings are used in the two General Electric 360 HP – MD-620 Hoist motors which lift the weight of the ladle and its molten metal content.

The maximum-type bearings in the hoisting sheaves are mounted directly on the shaft without inner races, which greatly simplifies assembly for applications of this size.

Thrust bearings in the 25-ton and 75-ton auxiliary crane hooks are standard Rollway precision types with broad-area contact between rollers and plates to prevent Brinelling and assure freedom of rotation under the heaviest loads.



Sheaves ready for assembly on shaft and installation in lifting beam.

For bearings that accomplish the extraordinary in an ordinary manner, write, wire or 'phone Rollway Bearing Co., Syracuse 1, N.Y.

ROLLWAY® BEARINGS

ENGINEERING OFFICES: Syracuse • Boston • Chicago • Detroit • Toronto • Pittsburgh • Cleveland • Seattle • Houston • Philadelphia • Los Angeles • San Francisco

custom tailoring costs less than "ready-to-wear"

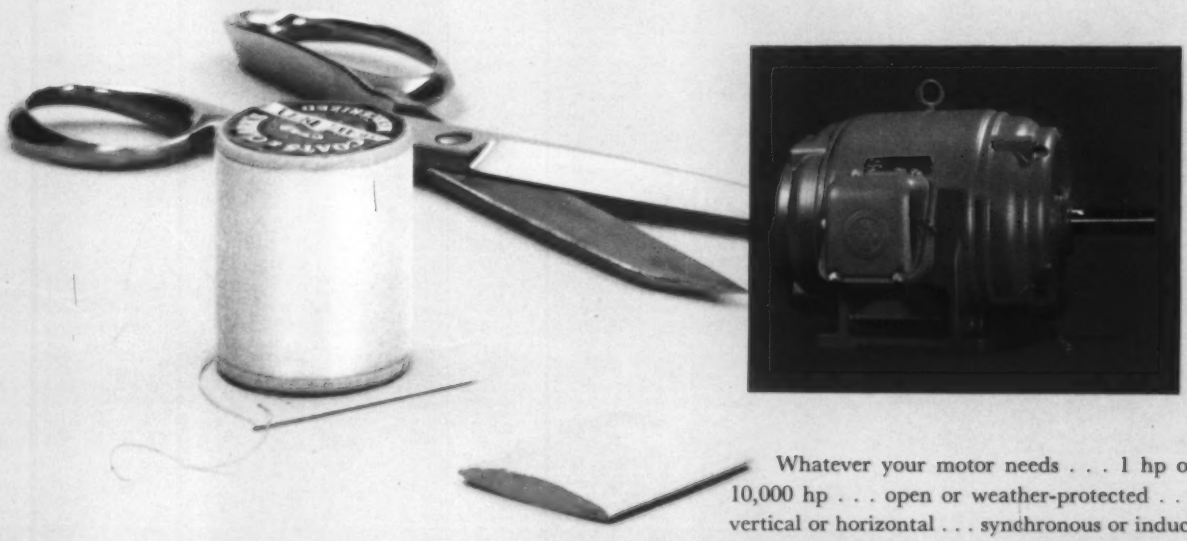
Buying an electric motor with "ready-made" insulation can be a costly luxury.

Motor operating conditions vary so widely throughout industry that Fairbanks-Morse insulation systems are *tailored* to actual operating conditions . . . not *standardized* to "the average".

"Ready-made" insulation systems are an "across-the-board" compromise with *average* operating conditions. When *your* case is the all-too-frequent exception, the compromise is costly.

Even in "hard to fit" cases we build motors rated, dimensioned and insulated to furnish unfailing power. Insulating materials are carefully tested, selected, treated and prepared so that insulation as well as motor enclosure is *matched* to the job. Entire insulation system is custom tailored to meet emergency overloads, temperature extremes, corrosive atmospheric conditions . . . whatever combination of factors affects motor life and performance of your *specific* operation.

This *flexible* application of varied insulating materials and processes "pays off" in low maintenance, uninterrupted production, prolonged service.



Whatever your motor needs . . . 1 hp or 10,000 hp . . . open or weather-protected . . . vertical or horizontal . . . synchronous or induction . . . AC or DC . . . Fairbanks-Morse builds it, builds it right, builds it to last. Get the facts . . . drop a line today to: Fairbanks, Morse & Co., Freeport, Illinois.

Fairbanks, Morse

ELECTRICAL DIVISION

A MAJOR INDUSTRIAL COMPONENT OF **FAIRBANKS WHITNEY CORPORATION**

"Two metalworking machines for the price of one?"

"I didn't believe it until a Ryerson machinery specialist showed me how.

"As a fabricator of stainless steel kitchen equipment, I was recently looking for a new squaring shear. I was considering one with a gap-type frame that would do my regular shearing, and an important notching operation as well. But when a Ryerson machinery specialist studied the problem, he recommended *two* pieces of equipment instead of one—at no increase in total cost. I got an underdriven shear and a universal metalworking machine that would do my notching plus many other jobs—adding versatility to my entire operation."

Why not have Ryerson study *your* machinery requirements? You'll get unbiased recommendations and a choice of 2800 different pieces of metalworking equipment. Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Illinois.

Here Are Final GNP Data for '59 and First Quarter Estimates

The Commerce Department last week released final figures for last year's gross national product and estimates for the first quarter's annual rate:

	Year		First Quarter	
(Billions of dollars)	1959	1958	1960	1959
Gross National Product	482.1	444.2	501.3	473.1
Personal consumption expenditures	313.8	293.5	323.3	306.1
For durable goods	43.4	37.3	44.2	41.6
For nondurables	147.6	142.0	150.5	149.6
Gross private domestic investment	72.0	56.0	79.3	70.9
Producers' durable equipment	25.8	23.1	27.1	23.9
Change in business inventories	5.9	−2.5	11.4	7.6
Net exports	−1.0	1.2	1.2	−1.0
Government purchases	97.1	93.5	97.5	97.1

Profits Up in First Quarter

Aftertax profits of U. S. corporations reached a $25 billion annual rate (seasonally adjusted) in the first quarter (vs. $23.5 billion in 1959's first quarter and $22.7 billion in the fourth), says the Commerce Department.

Project 'Deep Dip' Probes Ocean Floor

The Navy will study ocean bottoms with the unmanned sphere pictured above. Made of 1 in. thick tool steel, the 30 in. diameter sphere (above, left) was built by Baldwin-Lima-Hamilton Corp. It houses equipment to make magnetic, electromagnetic, radioactive, and acoustic measurements, and for underwater photography, bottom sampling, and current measurement. A gasoline filled flotation bag (being lowered in photo at right) pulls the sphere back to the surface once it is severed from its anchor.

Small Firms Get More Missilework

Small companies supplying the missile industry are getting a bigger slice of the business, reports Aerospace Industries Association. In the first quarter, more than 5000 small firms got 55 per cent of all subcontract funds awarded for a major ICBM program—vs. 45 per cent during all of 1959.

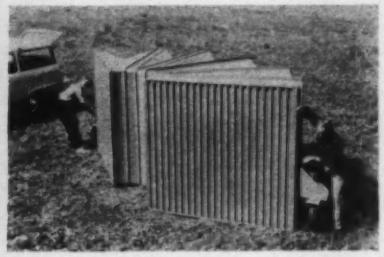
Executive Demand Tapers Off

You'll find fewer firms bidding for your services as a middle or upper level executive today than you would have found a year ago. Heidrick & Struggles

Inc., Chicago executive recruiting firm, reports that executive openings during the second quarter were down 15 per cent from the first quarter and 14 per cent below the year-earlier level. But demand still outruns supply in most areas. Here's a breakdown of percentage change in demand during April-June, 1960, vs. April-June, 1959:

Personnel	+21%	General engineering	+ 9%
Financial	+37%	Defense engineering	−67%
General administration	−47%	Marketing	−22%
Manufacturing	+16%	Total	−14%

Alcoa Promotes 'Instant House'



Unhitch the trailer, move two end panels until they spread out like a fan, lift the panels—instant house! That's what Aluminum Co. of America is trying to get across with this latest addition to its "Forecast Collection" of new designs in aluminum. This unit features individual rooms shaped like pie slices.

Employment to Rise in Third Quarter

Nearly 1 in 4 U. S. companies will expand employment this quarter, finds a survey of 2500 firms by Manpower Inc., international temporary help firm. Here's the breakdown:

	Expect Increase	Expect Decrease		Expect Increase	Expect Decrease
Farm equipment	16%	10%	Fabricated metal products	25%	15%
Construction	34%	5%	Furniture & fixtures	13%	9%
Transportation equipment	30%	9%	Primary metals	10%	12%
Electrical appliances	20%	7%	Machinery	34%	13%

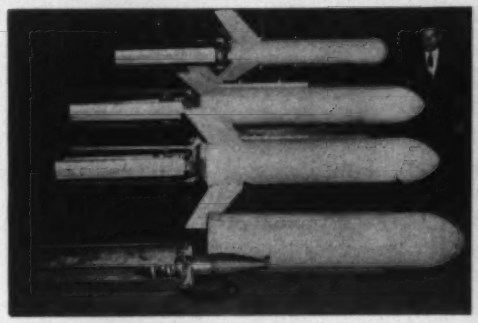
Will Political Talk Cut Farm Equipment Buying?

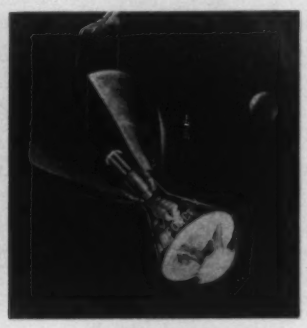
During the coming political campaign, farmers may be led to believe they are in worse economic shape than the facts indicate, and that psychological deterrent could affect farm equipment sales in the second half. So reports C. L. Dickinson, director of research, Farm Equipment Institute. He says there could be a "fairly substantial interest" in buying new equipment after this year's harvest, and he looks for total farm income this year to approximate the levels of the last few years.

Outlook for Gas Appliances: Up, but Not Enough

Look for second half unit sales of gas appliances to jump 32 per cent above the first half level, but fall 3.1 per cent below the pace set in 1959's second half. That's the finding of a survey by the Gas Appliance Manufacturers Association. First half sales were 8.7 per cent below the year-earlier mark. For 1961, the survey respondents predict a 5.1 per cent increase over the 1960 level.

Here's Way to Recover Space Capsules



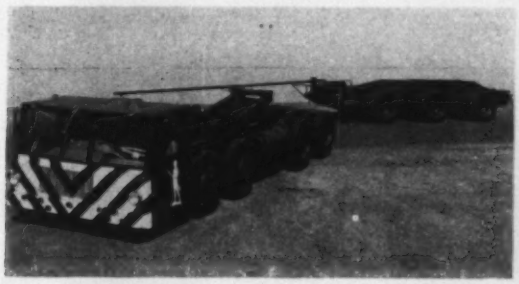


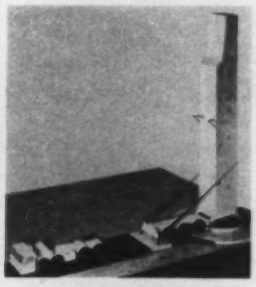
Kaman Aircraft Corp., Bloomfield, Conn., has won an Air Force contract to develop and test its idea for a guided recovery device for space capsules, nose cones, and other high flying objects. Photo at left shows four test "rotochutes"; sketch at right depicts an application—providing deceleration for a manned capsule being returned from orbit.

Construction Equipment Sales to Ease This Year

Look for the nation's 630 construction machinery and equipment firms to ship about $1.7 billion worth of products this year (vs. $1.8 billion last year, $1.9 billion in 1958), predicts the Commerce Department. It would represent an operating rate of about 56 per cent of capacity.

How 'Minuteman' Will Be Moved





This truck and carriage unit (left), built by GMC Truck & Coach Div., under subcontract from Boeing Airplane Co., is designed to haul Minuteman ICBMs to underground launching pads. The model (right) shows how the missile (in a container) will be raised hydraulically and lowered into its silo. The vehicle features a V-12 engine, air suspension, and air conditioning. The cab is only 6 ft high.

USDA Will Trade Food for Tungsten Carbide

The Department of Agriculture is offering to exchange agricultural commodities for 1.1 million lb of tungsten carbide powder. The tungsten concentrates must originate in friendly foreign countries and processing into tungsten carbide powder must be done in the U. S.

Two Tycoons to Develop Ore Tract

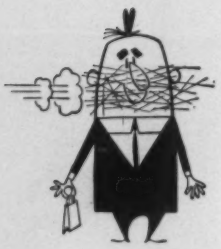
Aristotle Socrates Onassis, shipping tycoon, and Paul Getty, multimillionaire oilman, are joining forces to develop a 10,000 acre tract of potential iron

ore property along the north shore of Saguenay River in Quebec. Their company, Commonwealth Getty Mining Co. of Canada, is headed by Dan Keefe, who says potential customers are in Canada, Japan, Germany, and the U. S. Preliminary tests indicate 20 million tons of ore with an iron content of 47 to 61 per cent.

Steel Import Tide May Turn Up Again

Washington sources close to the steel industry are still concerned about the balance of steel exports against imports—despite the fact that the unfavorable balance was reversed in May for the first time since November '58 (imports were 272,000 tons vs. exports of 320,000 tons). Business & Defense Services Administration predicts 1960 imports will exceed exports by a little less than a million tons. A possible complicating factor: Leveling off of the European and Japanese booms, creating price cuts by the foreign steelmakers to boost sales in this country.

Straws in the Wind



New orders for foundry equipment in May jumped 62 per cent above the April level, reports the Foundry Equipment Manufacturers Association . . . Business failures rose 5 per cent in June to 1334, with record dollar liabilities of $126.5 million, Dun & Bradstreet reports . . . Frigidaire's new, 20 model line of laundry appliances represents the most extensive retooling and redesign program in the division's history . . . Wheeling Steel Corp. says it costs $19,455 to provide a job for each of its employees—75 per cent more than a decade ago . . . 32 per cent more bicycles were imported into the U. S. during 1960's first five months than in the like 1959 period . . . The power mower industry will use 68 million lb of aluminum this year—18 million lb more than the boating industry, asserts Don Hartmann, general manager, Moto-Mower Inc. . . . Strategic Materials Corp. will expand its Niagara Falls, Ont., plant to use the Strategic-Udy process for production of stainless steels and heat resisting alloys . . . Employment rose 1.4 million in June to a record 68.6 million, while unemployment rose 1 million to 4.4 million, the Labor Department reports. Udylite Corp., Detroit, is introducing a new process, called N2E, for electroplating semi-bright nickel . . . First half personal income ran at an annual rate of $400.2 billion—up 5 per cent from a year earlier.

Metalworking Pulse

The Business Trend: For the first time in three months, STEEL's industrial production index has risen above the 1959 level. Reason: Last year's steel strike. The trend line is likely to remain in this relationship throughout the fourth quarter. **Autos:** Output rose last week as Ford returned to normal production. But model changeovers will be the rule for several weeks to come. **Steel:** The ingot rate continued to be influenced by seasonal factors.

- **INDUSTRIAL PRODUCTION**
  - Week ended July 16 . . . **148†**
  - Year ago **138**
  - Details on Page 93
- **PASSENGER CAR PRODUCTION**
  - Week ended July 23 . **122,000***
  - Year ago **124,446**
  - Details on Page 90
- **INGOT PRODUCTION RATE**
  - Week ended July 24 . **54.6%†**
  - Week ago **51.8%**
  - Details on Page 156

†Preliminary *Estimated.

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MUSIC TO A CUSTOMER'S EAR . . .

Once there was a manufacturer who looked everywhere to find tubing that would solve a knotty production problem. But tolerances were so close, specifications so rigid, that conventional sources couldn't help him. Then he read about Michigan Seamless' TAILORED TUBING—made by a specialty mill with 33 years' experience! Result? Our production-engineering-metallurgical group quickly presented a solution that was "music" to the ear of this worried manufacturer! If you have a tough job for tubing, write or wire, we'll supply the answer!

MECHANICAL, AIRCRAFT, PLAIN AND FINNED HEAT-EXCHANGER TUBING

MICHIGAN SEAMLESS TUBE COMPANY

SOUTH LYON, MICHIGAN

A SUBSIDIARY

GULF STATES TUBE CORPORATION

ROSENBERG, TEXAS

TT

TAILORED TUBING

by

Michigan Seamless Tube Company

Gulf States Tube Corporation

See LeBlond Booth 810 at the Machine Tool Exposition in Chicago, September 6—16.

FINISH:

Reason enough to buy LeBlond

The glass industry is beginning to turn to mold plungers hard-surfaced with Colmonoy 6 to withstand the corrosion of molten glass. At 57-59 Rockwell C hardness, you don't machine such plungers on ordinary lathes—if you can machine them at all.

Yet Overmyer Mould Company of Winchester, Ind., turns Colmonoy coated plungers in 3 passes *to a 10 micro-inch finish.* That's more than fine enough to *use as-machined.*

Overmyer does it with 15″ LeBlond Dual-Drive Lathes equipped with LeBlond tracers and constant surface speed control. From 1000 rpm at start of cut to 125 rpm at finish the Dual-Drives supply smooth, vibrationless power.

Rock-steadiness for turning rock-hard materials . . . Rigidity without excess weight or size . . . These are strong reasons to buy a lathe. They are reason enough to buy LeBlond.

LeBLOND *of Cincinnati*

THE R. K. LeBLOND MACHINE TOOL CO.
World's Largest Builder of a Complete Line of Lathes
CINCINNATI 8, OHIO

Why 'Free' Engineering?

In recent weeks, we've heard a lot about "free" engineering, one of industry's most perplexing, recurring problems.

Like sin, most people are against it, but few are willing to do much about it.

The problem takes many forms, but, essentially, it shapes up like this:

Company X needs a plant addition, a machining transfer line, or a piece of processing equipment.

It asks five companies for bids.

All five put their engineering departments to work on proposals.

Each company spends, say, $5000 on drawings and estimates.

The bids go in, and one bidder gets a contract, and perhaps gets his $5000 back—as part of the gross contract figure.

But the $20,000 spent by the four other companies goes down the drain.

Or maybe Company X decides to "borrow" the five proposals and awards the contract to a sixth company. Company X might also find it could do the work itself.

As a result of all this duplication of effort, one thing is certain: Somebody pays.

It could be another customer of a successful bidder.

It could also be in the form of shortcut engineering that deprives Company X, or its counterpart, of genuine cost saving ideas.

The cure is not a simple one. But word is getting around that something must be done to eliminate wasted money and engineering talent.

One U. S. company runs off preliminary answers to inquiries on a tape controlled typewriter and adds individualized fill-ins before getting into expensive engineering work.

A British company uses printed forms to answer initial inquiries and provide rough quotations.

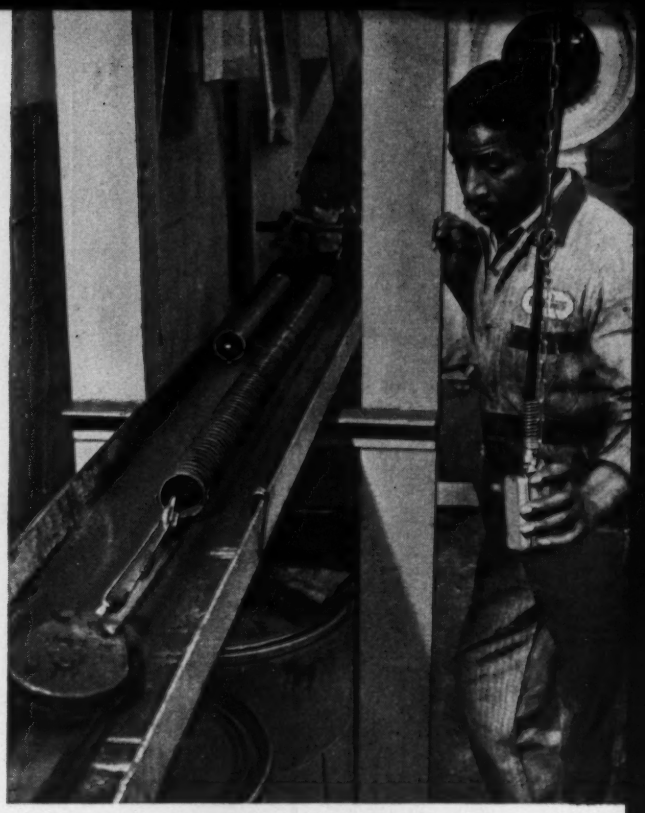
With such approaches, at least some of the burden of "free" engineering can be avoided.

We hope you will join the movement!

Irwin H. Such

EDITOR-IN-CHIEF

D. C. Forry, sales manager for Ridge Door, left, shows Pittsburgh Steel Salesman Robert Hogan how each spring is tagged, indicating pounds pull to assure that the proper weight garage door is matched with the proper springs.



Testing a 25-inch long extension spring to determine the pounds pull required to extend the spring to 67 inches. Engineering formulas tell workers what weight springs will balance each door. Correct pounds pull is marked on tag which is fastened to spring

How Pittsburgh Steel's Wire Helps A Door Man Keep His Balance

Ridge Door Company Uses Oil Tempered Spring Wire From Pittsburgh Steel Company To Coil Extension And Torsion Springs Which Balance Garage And Industrial Doors Within Five Pounds

It takes an even temper to make a garage door.

For Ridge Door Company of Monmouth Junction, N.J., "even temper" means dependable uniformity in oil-tempered spring wire it gets from Pittsburgh Steel Company.

Garage doors are deceiving. Doors identical in style and size can vary as much as 30 pounds in weight due to the wood's moisture content and other factors. Yet the springs which open and lower doors with mere finger-tip pressure must be in near perfect balance.

Uniformity of Pittsburgh Steel's oil-tempered spring wire enables Ridge Door, a division of Muskegon Motor Specialties Company, to match individual doors to springs whose pull is within five pounds of the door's weight. Here's that story:

The matching process begins with completion of the wooden door, made of high altitude, kiln-dried hemlock or Douglas fir. Each finished door is weighed carefully and tagged to show its weight.

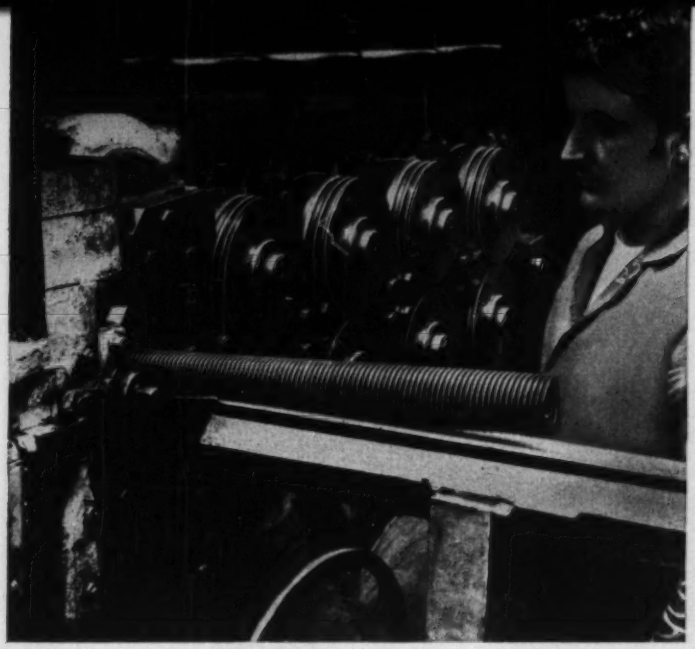
Meanwhile in the Spring Department springs are being coiled according to engineering formulas which take into account door weights, drum diameters and other factors. After coiling, each extension spring is tested to determine the number of pounds pull required by extending it a specified number of inches. This pull is machine stamped on a tag which is fastened to the tested spring.

For example, a 25-inch spring is extended to 67 inches and the pounds pull is automatically recorded.

Engineering formulas tell the workers what weight springs to match with different doors. As a result, Ridge Door is able to assure its customers that doors will be in balance within five pounds.

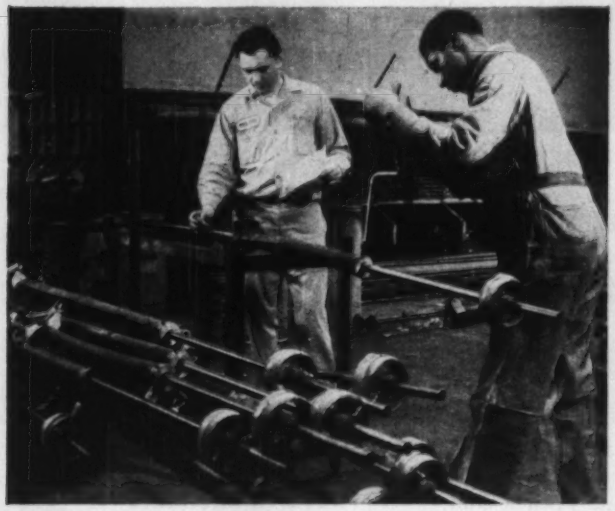
Uniformity of oil tempered spring wire makes this precision work possible. Springs coiled from Pittsburgh Steel wire can be depended on for consistent performance.

Coiling up to five tons of springs a day provides a tough test which

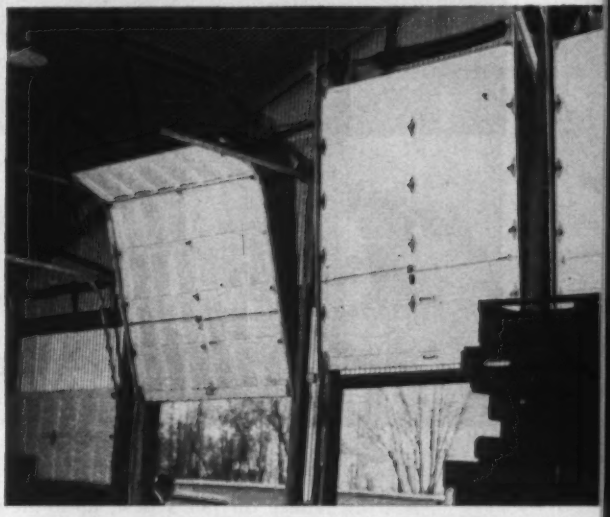


Uniform diameters and freedom from hard and soft spots speed spring coiling in the Monmouth Junction, N.J., plant of the Ridge Door Co. Division of Muskegon Motor Specialties Co. Pittsburgh Steel Co.'s oil tempered spring wire helps Ridge Door match springs to doors so precisely that finished product is in near perfect balance.

After coiling, springs are loaded into a two-unit, gas-fired furnace for heat treating. Springs are stress relieved for an average of 45 minutes at 475 degrees F. to achieve desired physical characteristics.



Assembling torsion springs on shaft. Each of these shafts will get two springs for use in raising a 16 by 7-foot double garage door. The springs shown here are coiled from wire .263 inch in diameter. The finished springs each have 120 coils. Drums and cables already are assembled.



A combination of high lift and vertical lift industrial doors produced with springs coiled from Pittsburgh Steel Co. wire is shown here. The installation is in the New Brunswick, N. J., warehouse of the Herman Forwarding Co.

Pittsburgh Steel wire passes.

Carmen Pellino, foreman of the Spring Department, puts it this way:

"We must have wire with uniform diameters, free from kinks as well as hard and soft spots.

"Variations in diameter prevent proper coiling since the wire will not pass through the rolls on the coiling machines properly. Soft and hard spots produce uneven coils and affect spring performance. We have found springs coiled from Pittsburgh Steel wire coil without trouble and perform well in service."

Other users of the wide range of wires for industry produced by Pittsburgh Steel get similar advantages. For improved production and greater customer satisfaction, call one of the district offices listed below. Real help is as close as your phone.

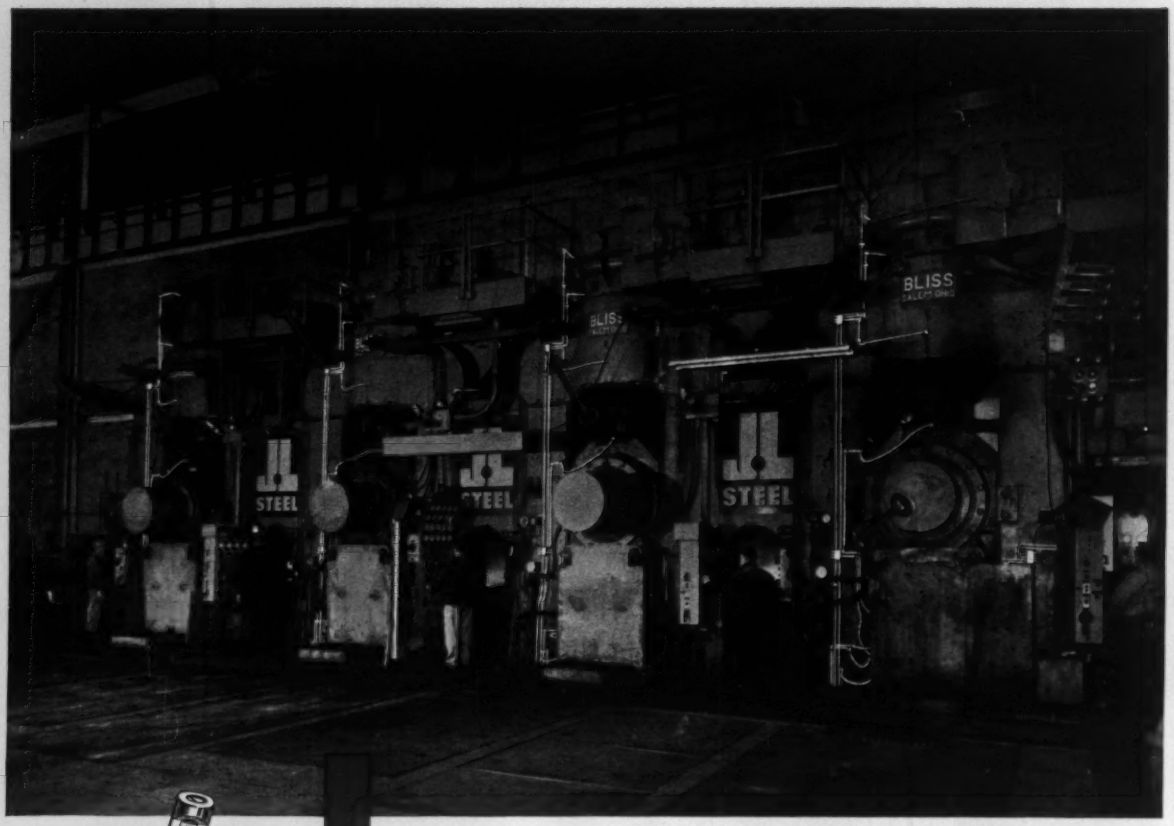
Pittsburgh Steel Company

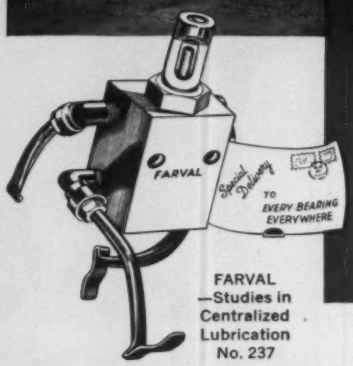
Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

Steel





FARVAL
—Studies in
Centralized
Lubrication
No. 237

Farval lubrication protects over 100 vital bearings on J&L's Exciting, New Cold Mill

Bearing failure on J&L's new, up-to-the-minute 77-inch cold reduction mill could cause costly shutdowns—boost operating costs sky-high. So Jones & Laughlin engineers wisely specified an automatic cycle-controlled Farval lubricating system to keep their Cleveland Works mill—one of the fastest, heaviest, most powerful four-stand cold reducing mills of its type in the world —operating at top production rates.

Farval is no new comer to the Steel Industry. Over the last 30 years it's been busy protecting all types of mechanical equipment —keeping it in top-notch operating condition.

Write for your free copy of Bulletin 26-T. It gives all the facts about Farval and how this versatile system of automatic lubrication can provide uninterrupted, maintenance-free production in your plant.

Farval Division • Eaton Manufacturing Company
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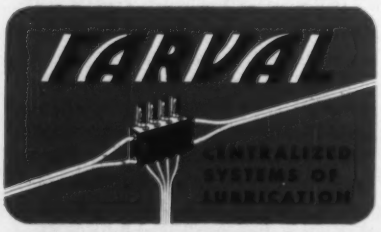
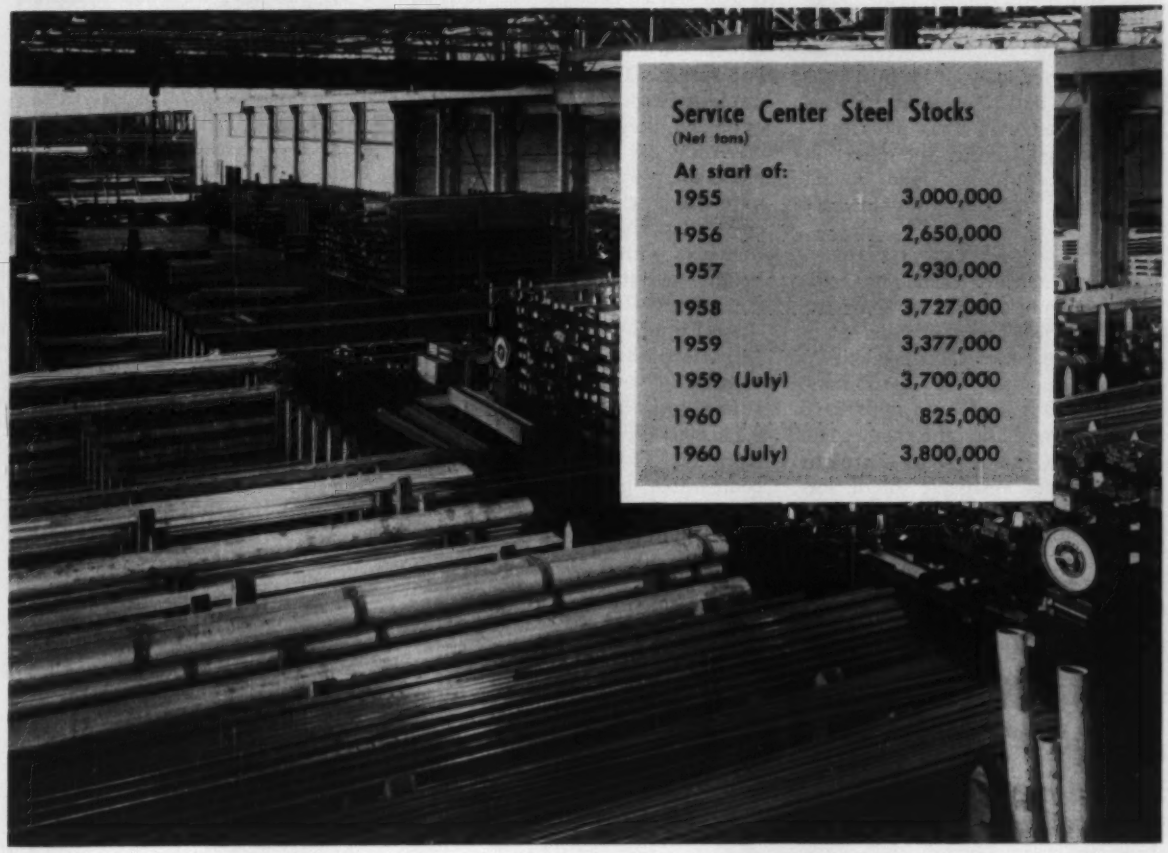
KEYS TO ADEQUATE LUBRICATION

Wherever you see the sign of Farval —familiar valve manifolds, dual lubricant lines and central pumping station—you know steel mill equipment is being properly lubricated.



Price Fights Jar Steel Distributors



Service Center Steel Stocks
(Net tons)

At start of:	
1955	3,000,000
1956	2,650,000
1957	2,930,000
1958	3,727,000
1959	3,377,000
1959 (July)	3,700,000
1960	825,000
1960 (July)	3,800,000

STEEL SERVICE CENTER operators are fighting to maintain their position in an increasingly competitive market torn by severe price cutting (STEEL, June 13, p. 203; June 27, p. 147; July 11, p. 131).

Their first half, 1960, sales volume was disappointing, shipments falling 10 per cent under those in the like 1959 period. An increase of 10 per cent had been forecast at the year's start.

Even more disconcerting, some distributors think second half volume will fall short of that in the first six months, largely because of seasonally slack summer demand.

• After August, demand is expected to pick up, but to what extent is anyone's guess.

Many distributors expect fourth quarter shipments about equal to those in the first three months. However, just as basic steel lowered production estimates for the year (from 130 million ingot tons to around 115 million), so have the distributors cut their forecast of shipments. They now predict they'll ship around 7.5 million tons of industrial steel products (carbon sheets, plates, shapes, bars, and stainless products), whereas 8.5 million tons had been forecast.

• Generally, the service centers will do well this year if their shipments fall no more than 15 to 20 per cent under the 1959 total.

In some products. notably sheets and certain specialties, the drop won't be that steep. Also, the overall showing will vary among districts and distributors. Those in the more highly industrialized areas have been hardest hit by the business contraction, while sellers in coastal areas have felt the impact of imports.

Some distributors maintain that only a sizable revival in general demand will relieve their market of the severe competitive pressures of recent months.

Included in those pressures: Mill competition for relatively small

orders, and severe price cutting by marginal centers.

• Steel service center marketing difficulties have stemmed from the unexpectedly rapid buildup of consumers' inventories since the strike.

The resulting curtailment in buying forced cutbacks in steel operations and the overbuilding of stocks at mills and service centers. To some extent, purchasing retrenchment reflected slowdowns in manufacturing, but the main reasons were a change in consumers' procurement policies in the direction of smaller inventories and buying held more closely to immediate needs.

Short term procurement has been made economically feasible by availability of quick deliveries from the service centers and the mills. Such de luxe service, of course, is one of the mainstays of the distributors' function. But lately, the mills have been getting into the act, some giving what amounts to overnight shipments of relatively small lots at mill prices.

• Marketmen insist that mill acceptance of small lot business is a temporary phase in a market adjusting to a slower demand tempo.

They say, that when the mills dispose of unexpectedly large stocks of finished steel resulting from order cutbacks and deferred shipments, the normal marketing pattern will be resumed.

The service centers were slow to adjust their procurement to the slower pace of consumer buying last spring. Their inventories shot up faster than expected. It's now estimated they hold record stocks, exceeding 3.8 million net tons, or more than 4½ times the 825,000 tons held when the steel strike ended last November. The total compares with 3.7 million tons on hand when the strike started (see table on Page 73).

Steel intake by the service centers (all classifications) in the seven months (November, 1959 - May, 1960) since the steel strike, totaled 9,336,809 tons, averaging 1,333,830 monthly. That's the largest for any comparable period since 1956-57, when 9,849,000 tons were taken in, for a monthly average of 1,407,000.

The intake started tapering in April, 1,409,000 tons being received in March, 1,230,000 in April, and 1,094,000 in May. Data for June and July are not yet available, but it's known the distributors continued to cut back their specifications during those months (see accompanying table).

• Despite the contraction in intake, service center stocks have continued to rise with consuming demand still contracting.

That situation has generated severe price cutting in recent weeks. The larger service center chains have sought to stem the market slide by adjusting downward their published base prices and quantity and item extras. Reductions ranged up to $7 a ton. But the move hasn't stopped the fighting. Some distributors are now offering material below the newly published minimums in a desperate effort to unload stocks and stimulate demand.

Little change in the price situation is in sight. Sellers say not much shift is likely until demand revives sufficiently to absorb most of the prompt shipment steel now available.

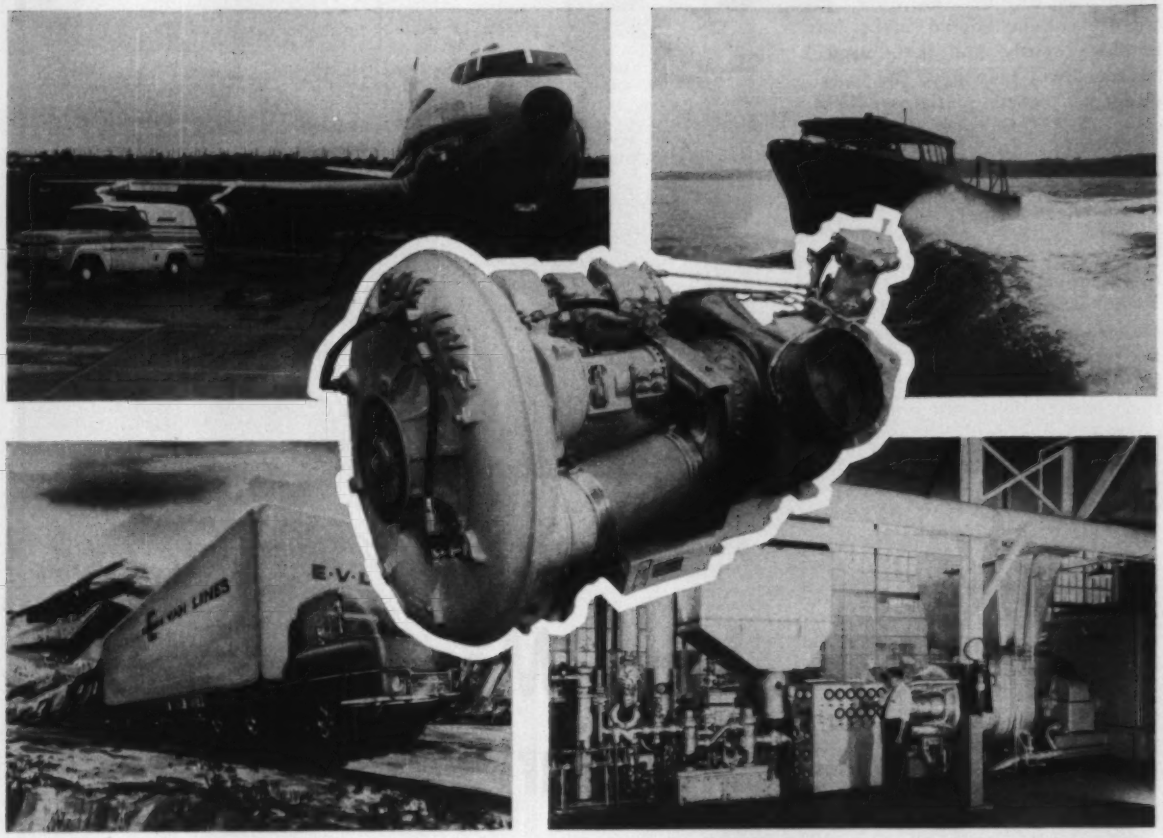
Service Center Steel Intake—1955-1960

(Net tons; 000 omitted)

	1955		1956		1957		1958		1959		1960	
	Net Tons	% *	Net Tons	% *	Net Tons	% *	Net Tons	% *	Net Tons	% *	Net Tons	% *
Jan.	1,033	17.8	1,412	19.3	1,479	19.8	821	16.6	1,070	17.8	1,602	19.3
Feb.	1,078	18.6	1,406	19.7	1,357	20.0	679	16.8	1,161	18.2	1,393	18.8
Mar.	1,283	18.4	1,526	19.7	1,456	19.8	752	17.8	1,510	19.1	1,409	18.1
Apr.	1,342	19.3	1,491	20.2	1,346	19.4	807	19.6	1,596	19.0	1,230	18.9
May	1,405	19.4	1,623	21.8	1,313	20.1	881	19.8	1,637	19.1	1,094	18.4
June	1,460	19.5	1,710	22.0	1,406	20.9	1,152	20.7	1,906	20.1		
July	1,227	20.4	1,476	22.5	1,097	20.0	832	21.1	846	20.9		
Aug.	1,354	20.1	.....	...	1,154	19.7	907	19.4	.....	...		
Sept.	1,373	19.4	1,535	22.6	1,098	18.8	937	18.0	.....	...		
Oct.	1,398	20.2	1,634	21.6	1,128	18.2	1,113	18.7	.....	...		
Nov.	1,416	20.5	1,480	20.9	919	17.3	1,007	20.2	1,009	21.1		
Dec.	1,423	19.7	1,418	21.4	752	15.8	1,015	19.1	1,595	19.7		
Totals	15,758	19.4	16,752	21.0	14,507	19.3	10,902	19.0	13,039	19.2	**6,726	18.8

Data from American Iron & Steel Institute.
*Per cent of total mill shipments.
**Five months.

Turbinemakers Broaden Markets



Boeing Airplane Co.

Gas turbines are gaining wider acceptance in many applications because of their simple design, small size, efficient operation at climatic extremes (−65 to 130° F) without warmup time, and ability to use many types of fuel

"DON'T WRITE OFF gas turbines just because they haven't hit the passenger car scene like a bomb," say turbinemakers.

Gas turbine manufacturers do have problems, but they're optimistic and are cashing in on markets where the advantages of their product really shine.

Industry sources estimate $145 million worth of turbines in the 500 hp and under class were sold between 1955 and 1959. In addition, larger units for specialized stationary equipment and aircraft were sold. The industry's big years were 1957 and 1958, thanks to military contracts. Turbinemakers are now broadening their markets to make up for defense cutbacks and gain wider commercial acceptance.

• **Outlook**—Most promising prospects are in "special purpose vehicles, marine and helicopter applications, pump and generator drives," states the Industrial Products Div., Boeing Airplane Co., Seattle. "The petroleum industry appears to be the best current new market," reports AiResearch Mfg. Co. of Arizona, a division of Garrett Corp., Phoenix, Ariz. General Electric Co., Schenectady, N. Y., believes: "The utility market holds the greatest market potential because of the efficiency gains possible with gas-steam turbine generating plants." Clark Bros. Co., division of Dresser Operations Inc., Olean, N. Y., asserts: "Ground support equipment for missile sites and the use of closed cycle gas turbines in nuclear power cycles have created new demands for turbines."

In the airplane field, gas turbine auxiliary power units and helicopters look good. Solar Aircraft Co., San Diego, Calif., has received more than $40 million in contracts for auxiliary power units from the Air Force. Gas turbines, made by Lycoming Div., Avco Corp., Stratford, Conn., will power the Air Force's new YHC-1B cargo transport 'copters.

Business is slower than expected this year, but firms contacted by STEEL anticipate an upturn in sales over 1959 ranging from 8 to 40 per cent.

• **Problems**—Like most relatively young industries, the gas turbine

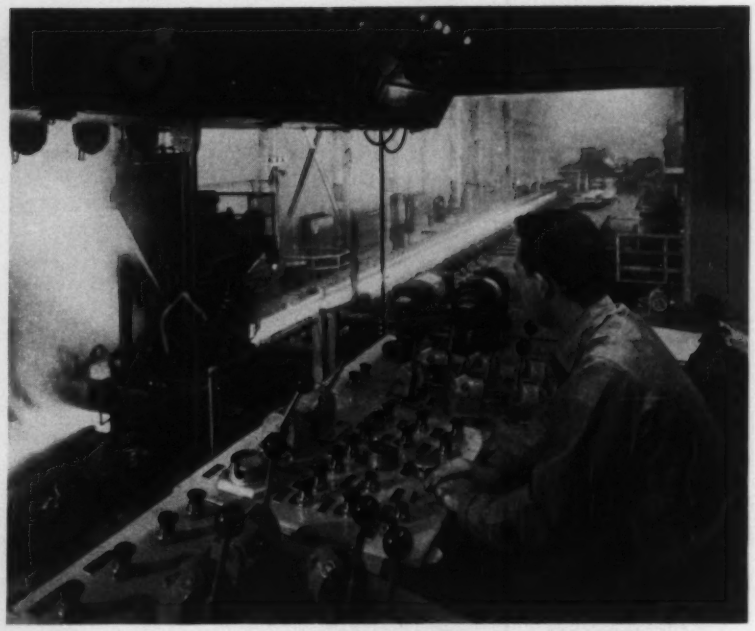
business is overcoming several problems. Short production runs and expensive metals and alloys needed to withstand heat and stresses often increase the initial capital outlay for a gas turbine. However, increased volume should make way for lower costs, and metallurgical advances will help solve the metals problem, boosting thermal efficiency and stabilizing the varying output due to different ambient temperatures and altitude. Volume production will also bring a greater variety of specialized equipment like that available to producers of reciprocating engines.

High fuel consumption is being reduced through better designs and regenerative systems. However, turbine manufacturers believe that fuel consumption alone is an unfair appraisal of a unit's value, so they feel that the industry has an educational job to do. Another factor: Other powers units have more operating hours to document reliability.

The gas turbine has been slow coming to the auto industry because motordom still has a full tooling amortization cycle to complete on aluminum engine facilities. And it's not certain that gas turbines will be as useful as piston engines in passenger cars. But they should appear widely on trucks by the end of the '60s. General Motors Corp. looks like the best bet here. In the meantime, gas turbines will be found more frequently on special purpose vehicles. Example: The Seattle and San Francisco Fire Departments have placed orders for gas turbine powered fire trucks.

• **Metals Studied** — Some of the metals now used in critical parts include Inconel X, Hastelloy X, NI-55, GM-235, HS-31, AISI-310, Udimet 500. New materials being considered for advanced engines include Rene 41, Inco 713-C, Udimet 700, molybdenum alloys, tungsten alloys, as well as cermets and various metal and ceramic coatings.

Boeing pretty well sums up the long range outlook for gas turbines: "The last 17 years which we have spent on small gas turbine research, development, and production have not been an engineering exercise. We expect the field to broaden in a comparatively short time until the turbine is a familiar power source on the everyday scene."



Steel Industry's Spending Plans

More Money for Auxiliary Equipment

STEELMAKERS will place orders for 2 per cent more capital equipment this half than they did the last half. The emphasis will be on nonsteelmaking equipment. That's what STEEL learned in a survey of 36 companies representing 58 per cent of the nation's steelmaking capacity. They told STEEL, confidentially, the dollar volume of equipment they plan to order this six months. Here is their report (second half vs. first) by equipment categories:

Oxygen converters & related equipment	Up 29%*
Rolling mills and auxiliary equipment	
Flat rolled product facilities	Down 18%
Blooming mill facilities	Down 7%
Tubular product facilities	Down 7%
Bar mill facilities	Down 16%
Cleaning & finishing equipment	Up 18%
Material handling equipment	Down 5%
Presses & shears	Up 2%
Machine tools	Up 29%
Heat treating & annealing equipment	Up 17%
Testing & inspection equipment	Up 20%
Joining & assembly equipment	Up 23%

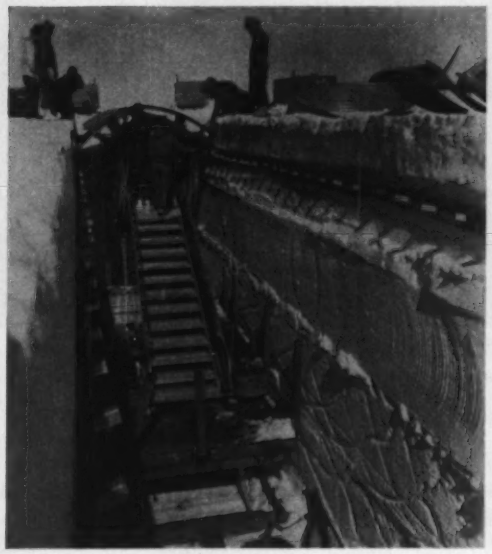
*Based on returns from seven companies.

City Under the Ice

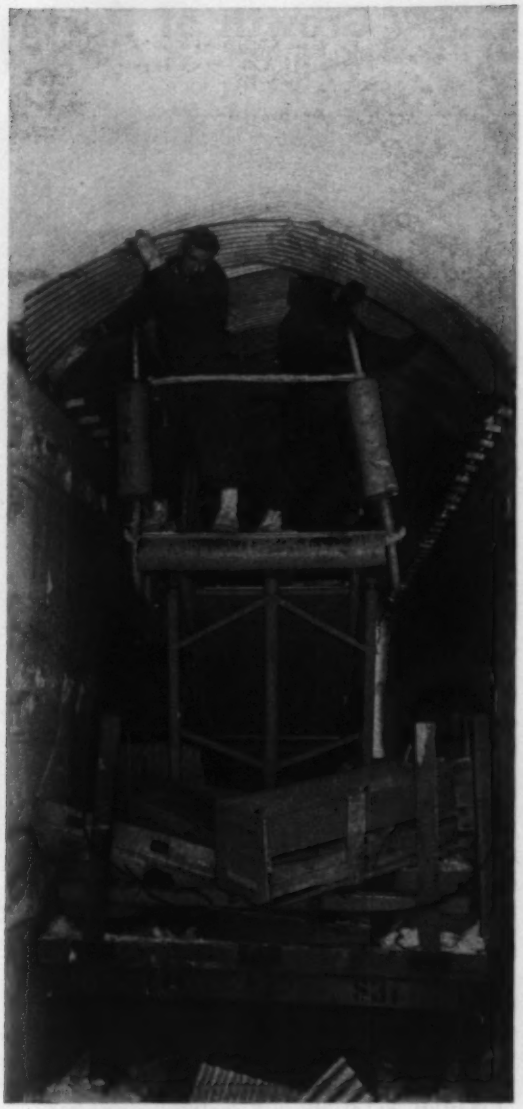
CORRUGATED STEEL ARCHES are playing a key role in the construction of an Army research center (Camp Century) under the Greenland Ice Cap, only 800 miles from the North Pole. The photos on this page show how they're used.

Many metalworking problems are scheduled to be studied during the ten year life of the project. In fact, a lot of metals research has been required in the construction of the camp.

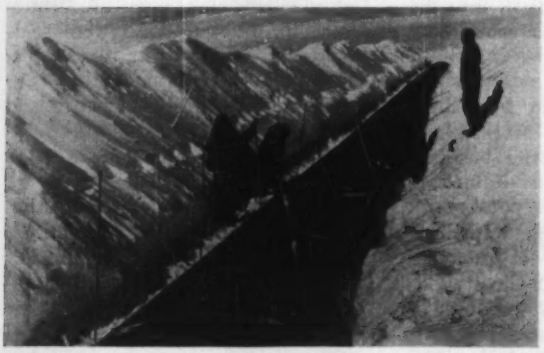
Facilities will include a prefabricated, nuclear powerplant that will be powered by 50 lb of enriched uranium-235.



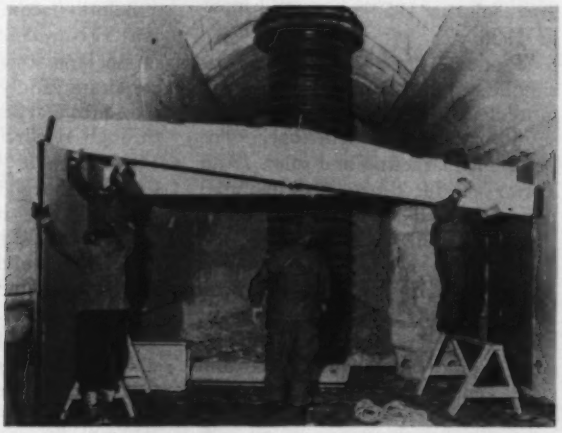
Members of the Army's Polar Research & Development Center install corrugated steel roofing in trench dug in snow



The steel roofing is pulled out after the snow has hardened for two days

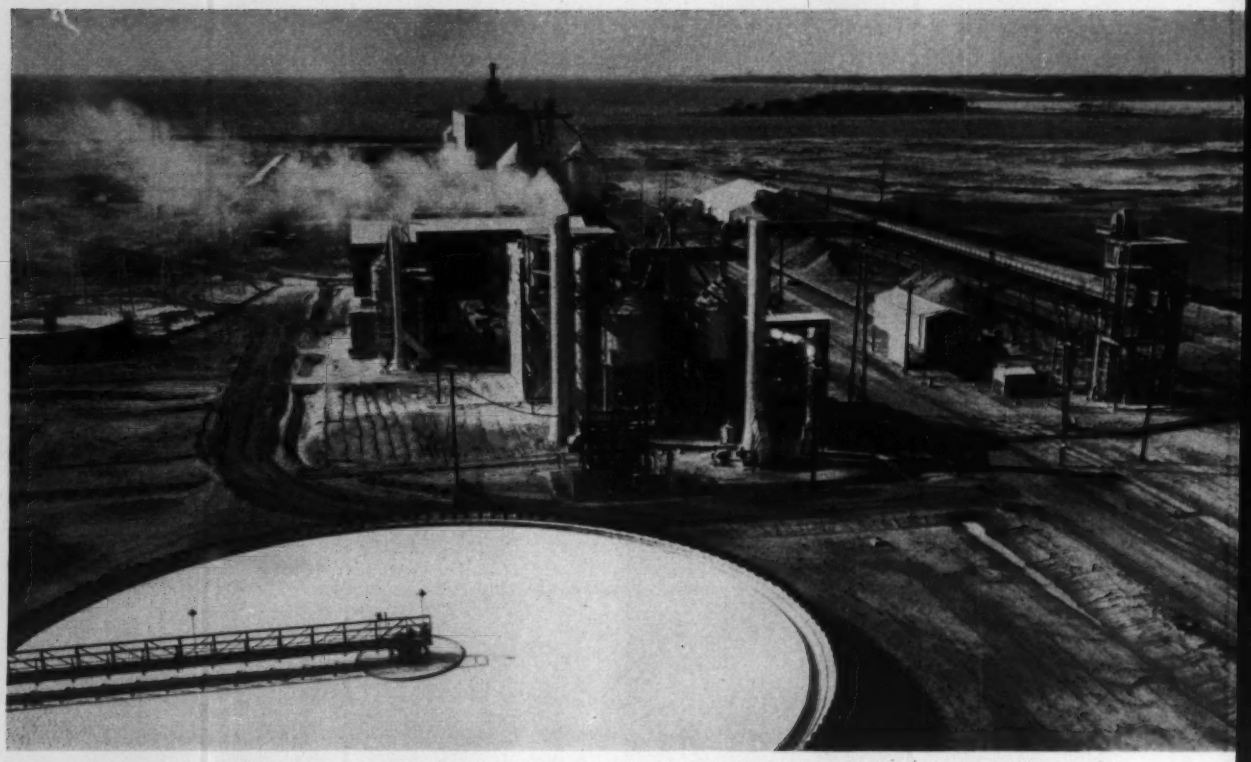


After pipes are fixed to the steel roof, snow is blown over the arches and allowed to harden. The pipes will form holes in the snow roof for wiring and plumbing



Final step in the construction of the underground city is the installation of prefabricated buildings inside the tunnels

Growth of Porter's Refractories Div. shows . . .



Magnesia is extracted from sea water and used in the manufacture of basic refractories in Porter's new, $13 million facility at Pascagoula, Miss.

1

SUPERMARKET OPERATION on an industrial level has been a key factor in the phenomenal growth of H. K. Porter Company Inc., Pittsburgh. That philosophy enabled the firm to ring up $226 million in gross sales in 1959 vs. $137 million in 1958.

"Product lines are chosen for simplicity, minimum assembly requirements, and quick turnover," says Burton W. Schellenbach, vice president-marketing and sales. "And Porter products are manufactured or warehoused within easy shipping distance of the companies that use them."

The company's growth has been stimulated by acquisition of firms whose products fit the Porter pattern, capital spending, research and development, and aggressive sales effort.

The procedure paid off in Porter's Refractories Div., which has mushroomed in six years from one company (acquired) into a multimillion dollar complex.

• The acquisition technique is used to build a complete product line.

Before acquiring a company, Porter considers its product reputation, and how it will fit into the corporate family. After acquisition, the subsidiary's line is upgraded through research and development.

Purchase of McLain Fire Brick Co., Pittsburgh, early in 1954, put Porter in the refractories business. But McLain's line was limited to ladle bricks and other pouring pit refractories, and Porter wanted to offer a wider range of products. Late that year, Laclede-Christy Co., a St. Louis firm that produced a full line of fireclay and silica refractory products, joined the burgeoning Porter family. And in 1956, Porter acquired Mullite Refractories Co., Shelton, Conn., a producer of mullite superrefractory bricks and specialties. By 1958, the division was operating 14 plants in seven states.

The division disposes of unrelated parts of acquired businesses. Example: In 1957, plants producing vitrified clay pipe at White Hall, Ill., and St. Louis were sold because their products didn't fit the promotion and marketing setup of the Refractories Div.

• Competent personnel are a vital element in acquisitions.

Key people of acquired companies are selected to run reorganized facilities. They are rewarded for topflight performance with promotions and increased salaries, says a Porter official.

The division also welcomes alert, aggressive people from outside the corporation, to fill important posi-

How a Company Can Expand

Porter officials confer on co-ordination of Refractories Div. operations and marketing (l to r); James P. Raugh, general manager, and A. R. Eakins, general sales manager, Refractories Div.; Burton W. Schellenbach, vice president-marketing and sales, and F. W. Elliott, group vice president, H. K. Porter Company Inc.

tions. The division's vice president and general manager, James P. Raugh, was previously vice president-operations for one of the country's largest refractories firms. And several young, aggressive men from the steel and refractories industries, like Emil Axelson, Pittsburgh district sales manager, give the division prestige and authority among primary metal producers.

• Here's how Porter spends money to provide faster service and better product quality:

The McLain, Laclede-Christy, and Mullite lines of refractory products met all needs of the steel, glass, nonferrous, cement, and power industries — until basic refractories entered the picture.

Noting the developing market for basic refractories and an opportunity to serve the South, Porter spent $13 million to build a fully integrated, basic refractories plant at Pascagoula, Miss. Completed in 1959, the plant is near Southern steelmaking centers and close to sources of dolomite, a vital raw material. Freighters unload chrome ore from Africa and the Philippines, at Porter's own wharf. The site also offers an unlimited supply of magnesia, extracted from sea water and used in making periclase grain.

Products made at Pascagoula: Chrome magnesite, magnesite chrome, and periclase bricks in burned, unburned, and steel encased bodies. The bricks are incorporated in Porter's all basic open hearth furnace design, announced early in 1960.

The division's mining operations in ladle brick clays are being centralized at a cost of $500,000. A single mining setup near Wellsville, Ohio, will serve all facilities in that area producing ladle bricks. The highly automated facility will turn out clay of the right analysis for ladle bricks and insure a uniform product. Previously, the various brick plants used clay from individual mines.

Brickmaking facilities at the Wellsville plant are also being improved by the addition of two new tunnel kilns; the $1.5 million project will be completed in 1961.

At Bessemer, Ala., the division's brick plant is being replaced with a modern facility, to be completed in 1961. The cost: About $2 million. The new plant will include automatic equipment for grinding, batching, and pressing, and a new tunnel kiln. The facilities will increase capacity to produce ladle bricks at the Bessemer Works, and will permit new lines of fireclay refractories to be added.

• Porter has expanded in other areas; acquisition of domestic firms with foreign subsidiaries has given the company international stature.

Four domestic firms joined the Porter group in 1959; National Electric Products Corp., Ambridge, Pa.; Herron-Zimmers Moulding Co., Detroit, and its subsidiary, Southern Moulding Co., Frankfort, Ky.; Peerless Electric Co., Warren, Ohio; and Hill Transformer Co., San Carlos, Calif. In January, Porter acquired 97 per cent of the stock of Patterson-Sargent Co., Cleveland.

Every year the company makes major capital investments at one or more of its divisions. In 1958 and 1959, $2.3 million was spent at Leschen Wire Rope Div., St. Louis. Expansion spending at the Huntington, W. Va., plant of Connors Steel Div. has come to $3.6 million since the facility was acquired by Connors in late 1956.

The company's first foreign move was in Canada, when Porter acquired Henry Disston Co., Philadelphia, which had a subsidiary in Toronto, Ont. Later, a subsidiary was acquired in Mexico.

In 1959, the company established H. K. Porter & Cie SA, a worldwide manufacturing and marketing subsidiary at Geneva, Switzerland, and has since announced small acquisitions in Holland, Scotland, and Brazil. The acquisition of a French steel, railway car, and industrial parts producer was announced on July 1.

What to Expect if Kennedy's Elected...He Favors More Public Spending...He's Not Against Higher Taxes

SEN. JOHN F. KENNEDY

● ACTIONS SPEAK LOUDLY—Senator Kennedy's actions in Congress and the platform his well wishers put through the Democratic convention provide a fair clue of what to expect of his administration if he wins Nov. 8.

The best Washington judgment of the senator is this: He's not a hare-brained liberal, but he'll still bring about some programs the likes of which haven't been seen since the early days of the New Deal. Those programs will be in an area sensitive to some businessmen: The conflict between business and government over which one should do a particular job that must be done in the national interest.

● ANOTHER NEW DEAL? — The public-private power controversy is a good example. Senator Kennedy favors the Tennessee Valley Authority; he voted for the St. Lawrence Seaway and Hells Canyon Dam.

He endorses a 2 million per year rate of new housing starts—again a matter of more federal aid. He promises to sign a sewerage treatment plant bill (it was vetoed by President Eisenhower). He says he will protect the government's $15 billion investment in atomic energy as if it were "part of the public domain." He calls for a "long range minerals policy."

The point: Senator Kennedy's natural liberal leanings, plus his treaty with the more public power minded Western and Southern elements of the nation, guarantee that the White House (if Senator Kennedy is elected) will be 100 per cent behind increased federal spending designed to take the financial burden off the states and minimize private industry's influence.

● HIS VOTING RECORD WITH LABOR—The Committee on Political Education (COPE) of the AFL-CIO last week endorsed the senator without reservation: He has "a perfect voting record, from organized labor's point of view, on labor legislation," COPE says. He voted 33 times in Congress in the interest of the unions, not once against them.

What COPE conveniently forgets, now that it thinks it has a winning candidate, is that many union men described the Landrum-Griffin Bill as the Kennedy-Landrum-Griffin Bill because the senator did not seek to modify it to meet the union's desires. Also to be noted: The Democratic platform this year is a little weak on Taft-Hartley reform.

The most specific promise to labor: Raising the minimum wage of $1.25 an hour and broadening the law's coverage.

● HIGHER TAXES BALANCE THE BUDGET—The senator has pulled no punches recently about his belief that up to $3.5 billion should be added to the defense budget for fiscal 1961. Moreover, he says he wants a balanced budget, and is willing to ask Congress for higher taxes. Before that drastic political step, the senator thinks "gross waste" in government should be ended, "billion in taxes which are owed" should be collected, tax "loopholes" should be closed, and the economy should be expanded to provide a larger tax base.

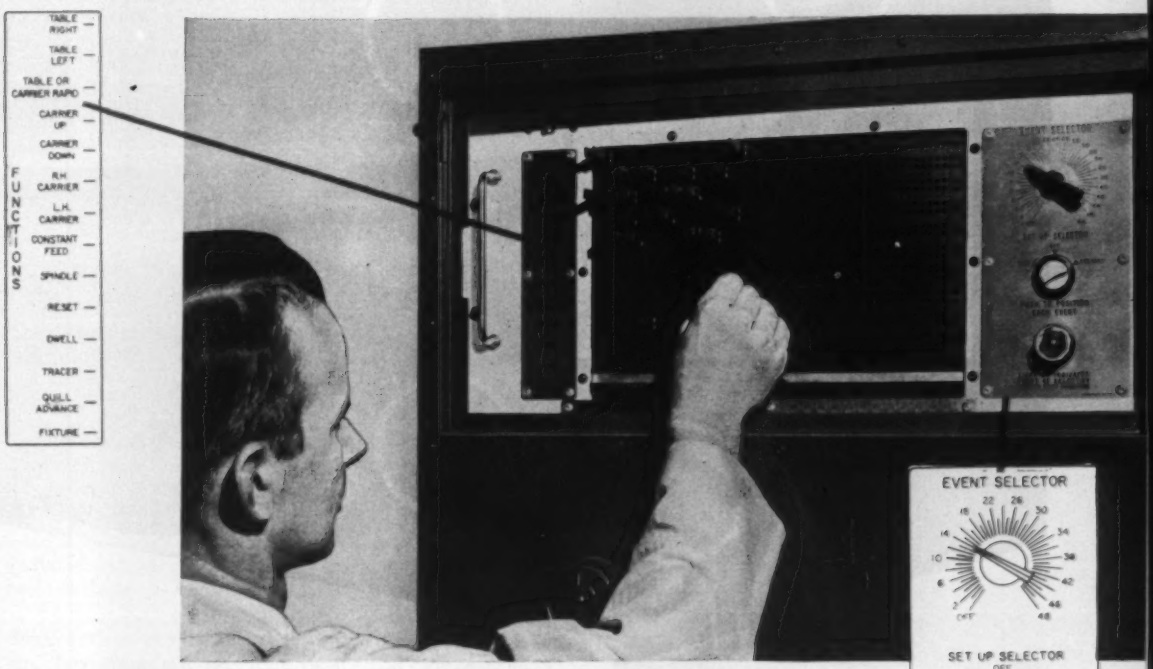
The senator has voted to repeal the 4 per cent tax credit on dividend income, to increase gasoline taxes, and to increase personal income tax exemptions. He has consistently fought the tight money policy when in effect. The Democratic platform contains nothing about depreciation reform which is specific; instead, it comments that "tax reform can raise additional revenue and at the same time increase legitimate incentives for growth."

To paint the full picture of the Kennedy philosophy, it is necessary to point out his adherence to economic theories which blame many problems on "administered price increases in industries where economic power rests in the hands of a few." Against that, you must match his need for conservative Southern votes to win in November. Senator Kennedy, as President, would be no friend of business, but he would be careful.

CINCINNATI

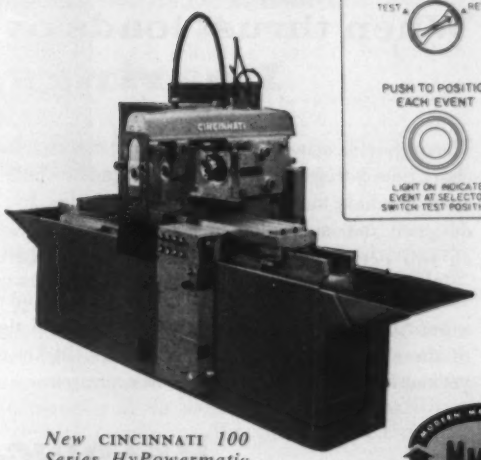
New **CINCINNATI** Telematic Control

Programs Automatic Milling Cycles through Simple Plug-in Selections



Cost advantages of automatic cycle milling now are available for smaller lots than ever before. With new CINCINNATI Telematic Control the operator programs all automatic functions of the cycle by merely inserting plugs in a panel board. If desired, a mask can be made for repeat jobs, exposing only the necessary holes. In addition to controlling all functions or movements of the machine table and spindle carrier, Telematic provides for auxiliary operations such as fixture clamping or indexing. A row of 24 holes opposite each machine function allows the operator to plug in complex automatic cycles involving up to 24 events. Additional panels, like the two-unit illustrated, can be supplied.

Telematic is the newest, most versatile and simplest of the operator-controlled programming methods. It is available on CINCINNATI 100 and 200 Series HyPowermatic Milling Machines. For details, write today for catalog M-2020-1. **Milling Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**



New CINCINNATI *100 Series HyPowermatic Milling Machine with 36" table travel. Rise-and-fall models include Telematic control.*

MMT-PE

Booth No. 1034

KNEE TYPE AND BED TYPE MILLING MACHINES • DIE SINKING MACHINES
• CUTTER AND TOOL GRINDERS • ELECTRICAL DISCHARGE MACHINES

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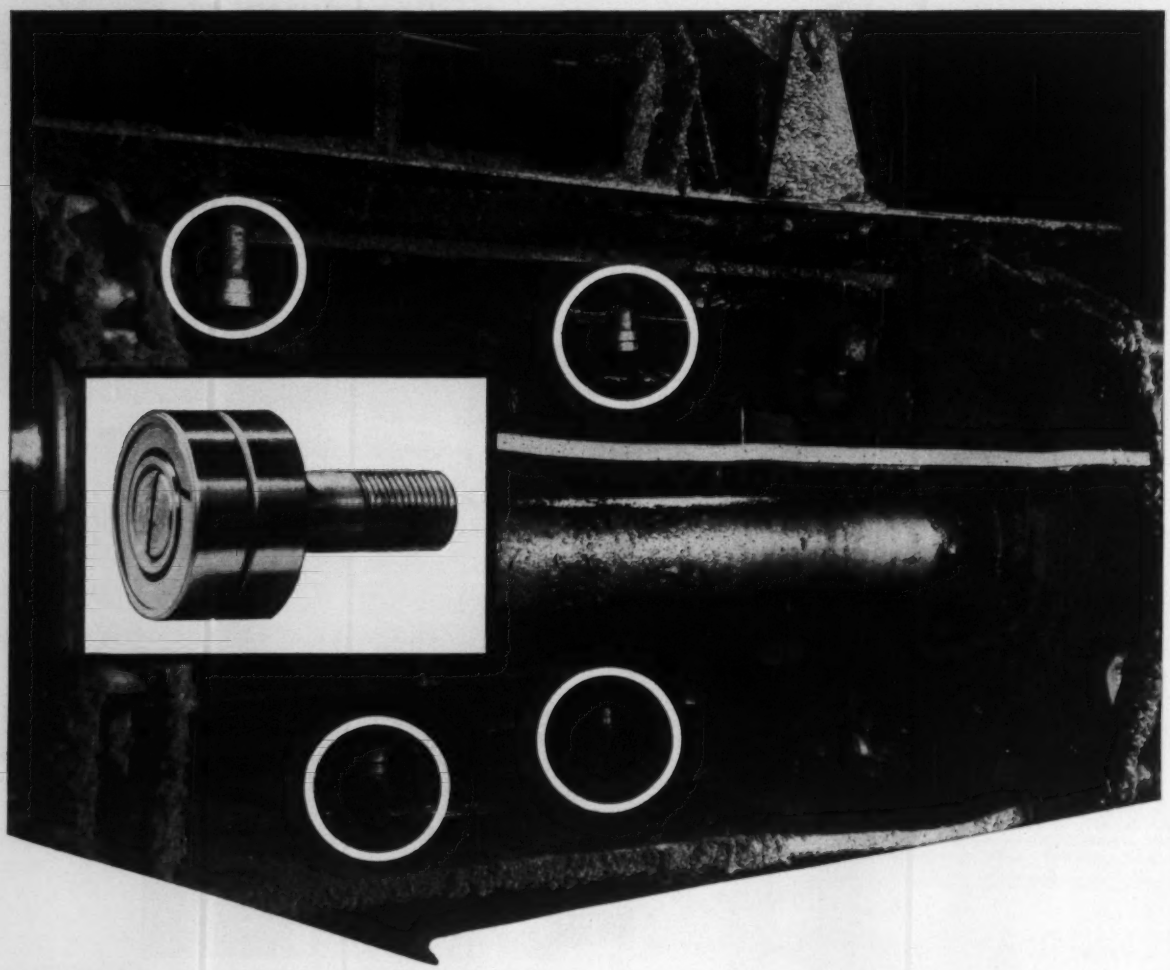
MILLING MACHINE DIVISION



When thrust loads overpowered original bearings...
Bearings, Inc. had the answer!

The original bearings on this automatic machine failed after a short time because they weren't designed to take the thrust loads to which they were subjected. Bearings, Inc. engineers designed and had built a special stud on which were mounted two permanently lubricated and sealed ball bearings.

To keep the cost of this design to a minimum "Locktite", a permanent bonding agent, was used to hold the bearings to the stud. This eliminated shoulders, locknuts or rings yet the bond is as strong as the best press fit.

This installation has now been in operation for many months with no failures reported.

This is not an isolated example of our services — surveys of bearing requirements, inventory control, application engineering, maintenance schedules and procedures are a regular and continuing part of our service to all customers to whom we supply replacement bearings.

Tell us how we can help YOU!

Providing bearing service in the North →

BEARINGS, INC.

**A recent acquisition*

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Lockland • Mansfield • Painesville • Toledo • Youngstown Zanesville • **INDIANA:** Ft. Wayne • Indianapolis • Muncie • Terre Haute • **PENNSYLVANIA:** Erie • Johnstown • Philadelphia • Pittsburgh • York **WEST VIRGINIA:** Charleston • Huntington • Parkersburg • Wheeling • **NEW JERSEY:** Camden • Newark • **NEW YORK:** Bolanrol Corp., Buffalo • Niagara Falls • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington
***NEIMAN BEARINGS DIVISION,** St. Louis, Mo., E. St. Louis, Ill.

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DIXIE BEARINGS, INC.

ARKANSAS: Little Rock • **FLORIDA:** Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge New Orleans • **N. CAROLINA:** Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport • Knoxville Memphis • Nashville • **VIRGINIA:** Norfolk • Richmond • Roanoke

Classic Nations Lift Industrial Sights

ITALY is among the top ten steel producing nations of the world. Present annual capacity, about 9 million tons, is treble the prewar level.

Italy's recovery can be credited to the desire to maintain a well equipped industry that can eventually compete abroad. Several steps were taken:

- Old facilities were replaced.
- Production was concentrated in a limited number of large works.
- Production was geared to fluctuations in the supply of iron ore and scrap.
- Full mill capacity was engaged to lower costs.

• **A Have-Not Nation**—Italy is dependent on outside sources for ore and coking coal. More than half her raw material must be imported—among steel producing nations, only Japan imports more. Because of this dependence, Italy is locating new integrated works near the coast.

Major outside sources of iron ore include Venezuela, Portuguese India (Goa), Algeria, and Tunisia. Sources of coking coal include: Germany, U. S., United Kingdom.

Italy has developed an extensive supply of hydroelectric power and has abundant resources of natural or methane gas, which is used mainly for firing of open hearth furnaces.

• **Capital Expenditures**—Investment in the iron and steel industry reached $79.15 million in 1957. Since then, the amount has gradually decreased. Estimated expenditures for projects approved and under construction for 1960: $33.5 million.

The Cornigliano firm, near Genoa, is modifying two blast furnaces to increase their capacity from 990 to 1320 tons per day. A third blast furnace with a capacity of 1760 to 1870 tons per day is being built. An oxygen plant is being installed and a new blooming mill is replacing an obsolete one. The only continuous wide strip mill (80 in.) in Italy is located here. In 1962, the works should produce 1.7 million tons of pig iron and 1.8 million tons of crude steel.

Enlarging the electric furnace installation at the AFL Falck works has boosted pig iron production to 19,800 tons per month. And steel capacity was increased to 33,000 tons per month by replacing six old Heroult furnaces with four, 55 ton Lectromet furnaces.

A new four high mill (Mesta) has been installed (capacity, 27,500 tons per month) with supporting equipment. Other investments have improved hot and cold rolling facilities, production of seamless tubes, and rod mill capacity.

Fiat Co.'s modern plant includes: Two electric furnaces for pig iron (100 tons per day each), three open hearths of 100 tons per heat each, and four other electric and induction furnaces of lesser capacities.

Two new projects are under construction: An integrated works producing 990,000 tons of pig iron and 880,000 tons of steel annually; a reduction plant for iron ore with an annual capacity of 330,000 tons.

The Ilva firm fired a new blast furnace (1320 tons per day) early in March at its Bagnoli Works near Naples. Total pig iron production will be raised to 935,000 tons a year. A blast furnace under construction at its Piombino Works will supplement two furnaces, increasing the mill's capacity to 990,000 tons.

The government recently announced plans to build an integrated iron and steel works on the coast near Taranto in southern Italy. Construction is to start in 1961-62. Completion is scheduled for 1964-65. It will have an annual capacity of 1 million tons. The industry's target is for the production of 10.5 million tons per year by 1965.

WORLD ALUMINUM capacity will be hiked another 52,500 tons by a reduction plant to be built in Greece.

A $207 million industrial complex is planned for the production of aluminum and hydroelectric power. Greek mines will supply the bauxite. The plant will cost $75 million. Other supporting units: An alumina plant to process bauxite (100,000 ton annual capacity) and three hydroelectric powerplants (550,000 kw total annual capacity). Their cost: $132 million.

The location of the aluminum plant has not been announced. Probable site: The Mt. Parnassus-Gulf of Corinth area adjacent to the port of Itea. The hydroelectric plants will be built on the Akheloos River in west central Greece at the towns of Kremasta, Preventza, and Kastraki.

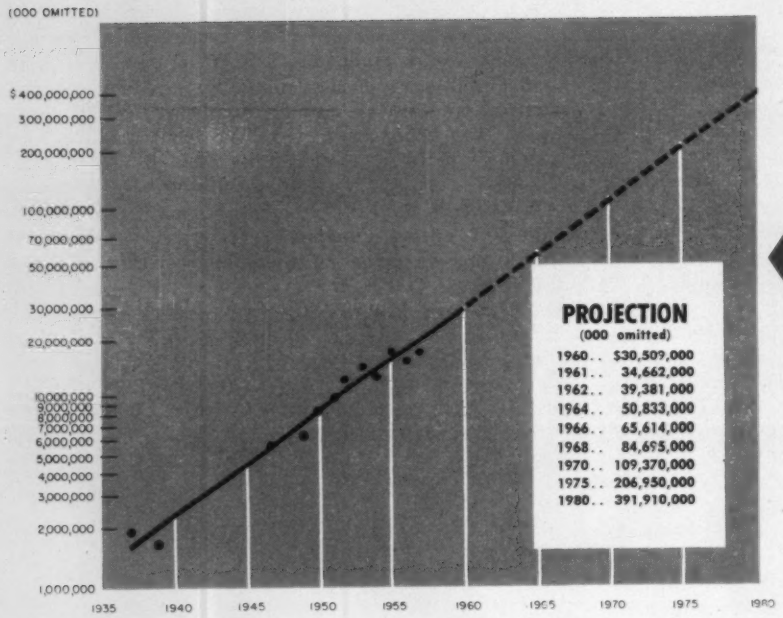
One power station, at Kremasta, will be the largest hydroelectric plant (400,000 kw) in Greece. It is expected to cost $82 million of which $31 million is to be made available through the Development Loan Fund.

The complex will create 1000 jobs.

It will provide more labor through an increase in bauxite mining.

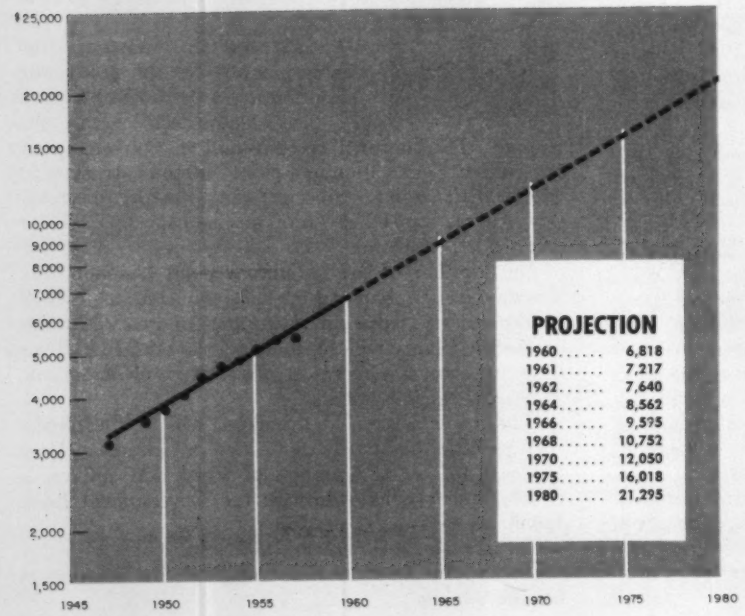
PROJECT 1980

Transportation Equipment To Move Fast in 20 Years



Value Added by Manufacture to Reach $391.9 Billion by 1980

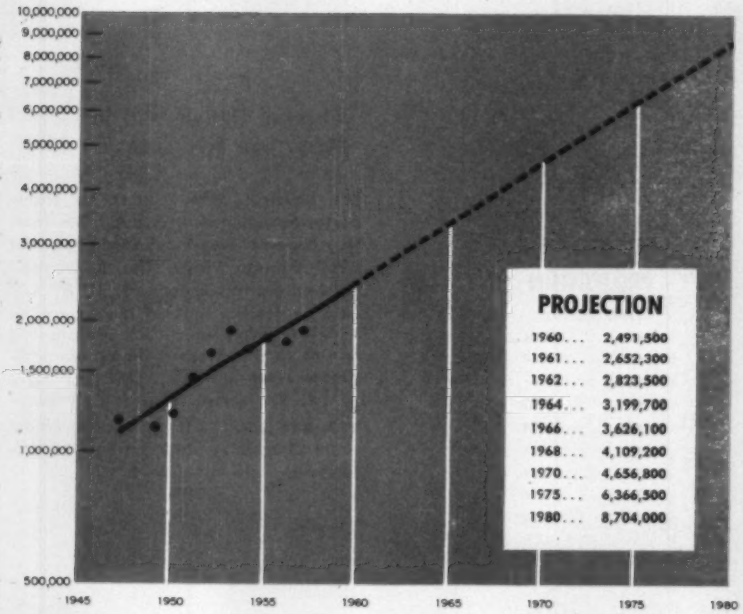
This chart shows the value added for each census year from 1937 through 1957. The dots in this and succeeding charts indicate the actual figure for each survey year. The line is the trend. Dots are missing for World War II years because surveys were discontinued then for security reasons. Dollar figures in this and other graphs are unadjusted, and the projections include estimates for inflation.



All Employees' Average Annual Earnings Will More than Triple

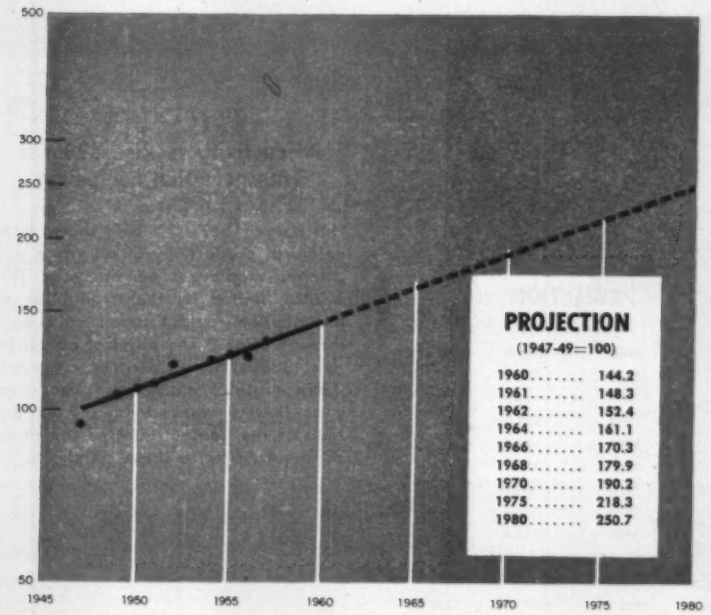
This chart is derived from corresponding census data for total wage and salary compensation and the total number of employees. Economic productivity, or the yearly ratio of value added by manufacture (above) to total earnings in primary metals, has been nearly constant at the $1.69 average for 1947 through 1957. This illustrates the Rucker share of Production Principle, and it shows that the employee's share of production for transportation equipment, taken as a whole, is 59.33 per cent of the values created and that the company's share averages 40.67 per cent.

Value added by manufacture will be nearly 13 times greater in 1980 than it is this year. Prices may rise by 74 per cent. Productivity should improve by 89 per cent. Those are some of the probabilities projected for Standard Industrial Classification 37 (transportation equipment) by Eddy-Rucker-Nickels Co., Cambridge 38, Mass., a management consulting firm. This is the fourth of six metalworking growth studies prepared for STEEL.



Employment Will More than Triple Within 20 Years

This charts both hourly and salaried employees for each census year from 1947 through 1957. Government figures are not available in earlier years. Although data extend back for only ten years, the trend for the decade is stable, and a projection for 20 years is believed warranted. Experience shows that established growth trends change slowly. But actual conditions in any future year may fluctuate above or below the trend. So all six of these projections represent probabilities, not precise predictions.



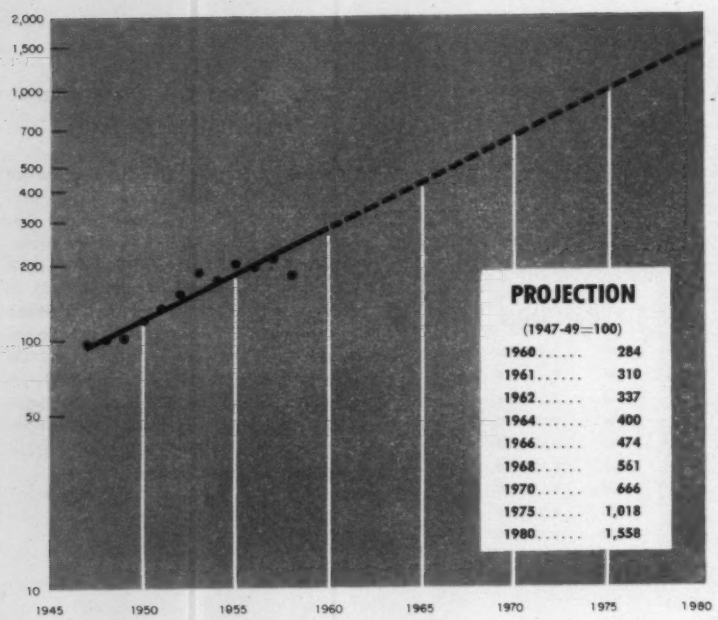
Transportation Equipment Prices May Climb 73.9%

This is a synthetic price index. No wholesale product price analysis for transportation equipment is available from U. S. sources. It's derived this way: Set up an index for value added by manufacture, using 1947-49 as the base of 100. Then divide that by the corresponding Federal Reserve Board index of industrial production for transportation equipment. The resulting index reflects the inflation likely for SIC Group 37.

(Please turn to Page 86)

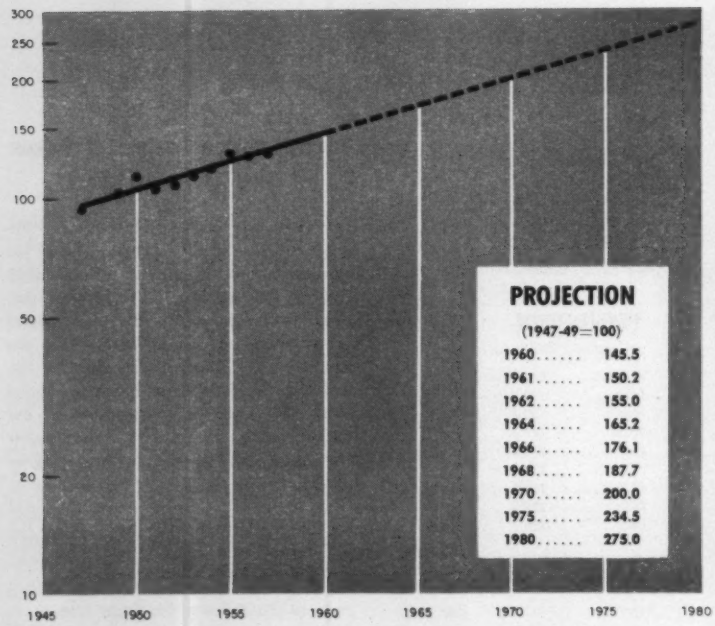
PROJECT 1980

• *An extra copy of this or the first three articles in the series (*STEEL, *June 13, p. 122, June 27, p. 54, and July 11, p. 56) is available. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio. The next study in* STEEL's *"Project 1980" will appear Aug. 8. By using material like this, you may win $1000. For details, see Pages 5 and 6.*



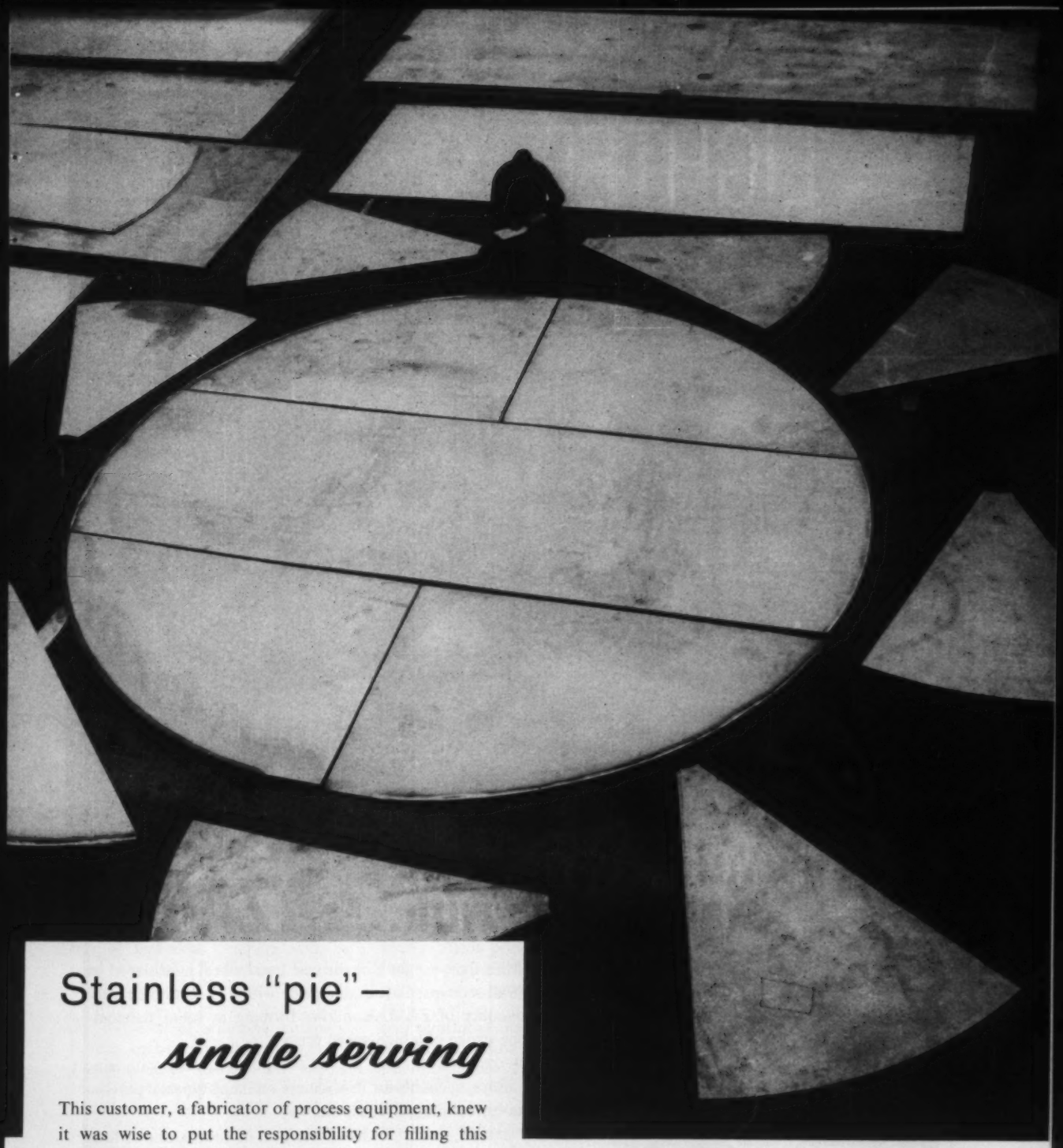
Physical Output Will Increase More than Five Times by 1980

The physical output index for transportation equipment is available from the Federal Reserve Board only for 1947 through 1957. The motor vehicle and parts segment of SIC 37 will account for the bulk of the expansion in this industry which will see physical output in 1980 more than five times greater than in 1960. Other elements of SIC 37 include aircraft and parts, ship and boat building and repairing, railroad moving stock and parts, motorcycles, and mobile homes.



Productivity to Rise 89% in Transportation Equipment

This index (1947-49 = 100) shows technological productivity of all wage and salaried employees per manyear. This is also limited by the availability of the physical output index only back through 1947. The physical output index (above) is divided by a special index of total manyears. The manyear figures were derived from Bureau of the Census data, as are many of the statistics in these six charts.



Stainless "pie"—
single serving

This customer, a fabricator of process equipment, knew it was wise to put the responsibility for filling this stainless steel order in the hands of a single producer—G. O. Carlson, Inc. He knew that our specialists, working with modern equipment, would make each item of the order "to specification." And he also knew that our delivery promise is a trust that we fulfill.

For your order—or orders—of stainless steel plate and plate products, come to Carlson. Here skilled men, working with the finest equipment, are determined to match your every wish.

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Strength of this light-weight zinc die cast hand wheel is achieved by rigid, thin-wall sections. Cast in one piece with a U-section rim, the excellent ductility of ZAMAK allows forming at room temperature with one stroke of a high-speed press.

This low-cost roll-forming procedure, possible only with zinc die casting alloys, accounts for its wide use on many types of parts—handles, knobs, couplings, locks, etc.

And the smooth, as-cast ZAMAK surface, of course, allows low-cost plating or painting for almost any type of product.

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HORSE HEAD PRODUCTS®

Paul O'Brien, Reynolds Metals Co., feels that extrusions may provide the wedge that'll open another big auto component market, but as yet . . .

Aluminum Bumpers Are Still in Trial Stage

ADOPTION of aluminum bumpers has been slower than aluminum firms anticipated. Ten thousand sets of extruded bumpers will be tried on 1961 Valiants. Pontiac Div., General Motors Corp., is awaiting the results of service tests on 150 sets of stamped bumpers. It may make a running change on Tempest later in the '61 model year. Several other automakers are considering lightweight bumpers for 1962.

Although the breakthrough hasn't arrived, aluminum producers aren't daunted. This week, STEEL presents their side of the bumper story. Steelmakers and platers will state their case for continuing with plated steel bumpers in a future issue.

• **Triple Pitch**—Each of the major aluminum companies has developed an approach to manufacturing passenger car bumpers (See STEEL, June 13, p. 128). Alcoa and Kaiser have followed the stamping route. Alcoa prefers anodizing as a finish. Kaiser is plating the light metal. Since anodizing is less costly than plating, it compensates for the additional material cost of aluminum, say Alcoa sources who claim their bumpers are directly competitive costwise with plated steel jobs. Kaiser suggests that the lower unit weight of its bumpers makes metal costs almost equal to those of steel. Plating aluminum is slightly less expensive than plating steel, so the final price again is within a few cents of carbon steel bumpers.

Both approaches appear to violate a basic aluminum pitch (you don't just substitute aluminum for steel). But the companies feel that their processes will let automakers and vendors use present tooling and plating equipment. Since capital investments for bumper lines are usually set up on fairly long amortization schedules, this means Alcoa and Kaiser can present carbuilders with a logical savings story plus the advantages of light weight and no rust.

• **No Substitution** — Reynolds Metals Co., Richmond, Va., has a different method which it believes will sell car companies on switching from steel to aluminum bumpers. Initial cost studies indicate that bumpers made with the Reynolds process range 50 cents to $2 less per unit than comparable plated steel jobs. Steel producers will contest that assertion.

Instead of substituting, Reynolds has developed a hot formed extruded bumper which is anodized. It's even lighter than stamped aluminum bumpers which must be made from heavier stock to provide the necessary strength. Says William G. Reynolds, executive vice president for research: "Production costs of bumpers can be cut 10 to 20 per cent, depending upon their size. Also, bumpers will be 50 per cent or more lighter and as strong or stronger than bumpers in use."

• **Process** — Although Reynolds can't comment, it reportedly will be doing the pilot bumper job for the Valiant at its Louisville facilities. Paul O'Brien, director of the company's automotive processing research, explains how the bumpers are extruded. "We use 6463-T6 aluminum, which is a bright finish, magnesium base alloy. The cast extrusion billets (6 to 8 in. in diameter) are heated to 950° F, then air cooled to 850° F. They're extruded into 60 to 80 ft lengths in 2000 and 3500 ton hydraulic extrusion presses," he explains.

After ends are trimmed, the extrusions are cut to bumper length. then they are shipped to another plant where they're heated to 1000° F in a controlled atmosphere furnace. After the sections are soaked 4 to 10 minutes, they are placed in preheated (250° F) carbon steel or Kirksite forming dies where a single press stroke forms

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all major configurations including the license plate slot and initial wraparound shape. The bumpers are then water quenched, trimmed, pierced, and the ends cold formed to final shape. After artificial aging in a precipitation heat treat furnace for 2.5 hours at 360° F, bumpers are buffed, chemically brightened in a phosphoric and nitric acid solution, then anodized.

• **Advantages**—Mr. O'Brien names three advantages of Reynolds' approach over stamping either steel or aluminum: Less weight, more design freedom, and lower capital investment. For example, the rear bumper on one low priced car weighs 25.7 lb in steel. The same bumper weighs about 15 lb in stamped aluminum and 9.5 lb in extruded aluminum, he claims.

The hot formed extruded bumpers can be designed for a nonuniform cross section, but stamped bumpers require a constant cross section. It means that extruded bumpers can be made of lighter stock and need to be beefed up only in critical stress areas. The entire cross section of a stamped bumper must be made to the thickness of the point of greatest impact and strain. A nonuniform cross section also permits greater design and styling flexibility. Suggests Mr. O'Brien: "It's easy to extrude a slot into the front of a bumper and then snap a hard rubber rub strip into it."

Capital investment and tooling are also areas of cost savings. "By using the hot extruded method, we avoid most of the preliminary blanking operations that are required for stamping. This means fewer expensive dies and fewer operations. In addition, we can get away with lighter presses which are almost a quarter of the tonnage capacity needed for steel or aluminum stampings," reports Mr. O'Brien. Results: Die life is doubled. Tooling costs are cut in half ($200,000 vs. an average of $450,000). Tooling leadtime can be reduced from a year and a half to six months, claims the aluminum firm.

• **Steel Costlier?**—When Reynolds compares just the steel bumper with extruded aluminum jobs, it figures it will realize some additional savings. Anodizing costs about 6 cents a square foot compared with an average of 75 cents for plating steel. Although the anodized finish is slightly less brilliant, it doesn't seem to be dull enough to concern automotive stylists.

Properly mounted, the aluminum bumpers are not subject to galvanic action which sets up electrolytic corrosion, but anodic films are softer than plated surfaces and are damaged by abrasion from road dirt and gravel. Reynolds does not feel it is a real problem. It thinks heavier anodic films (0.0003 in.) will help. So may different types of epoxy coatings—although so far the aluminum companies aren't convinced they are worth the slight additional cost. "Even if you break through the anodic film, the area can be easily buffed out and the slight difference in texture and color is almost invisible. Certainly, it's much less than would be the case if you had to bump out a pit spot or mark in a plated steel bumper," says Mr. O'Brien.

• **Less Scrap Too**—The aluminum extrusion process results in less than 10 per cent scrap loss compared with a 20 to 30 per cent scrap rate for steel bumpers. Reynolds figures it can reclaim most of its scrap and resell it for 18 to 20 cents per pound.

Concludes Mr. O'Brien: "We believe our approach offers more versatility than does stamping. The capital investment is less. The tooling costs are less. The final piece price manufacturing costs are lower."

U. S. Auto Output

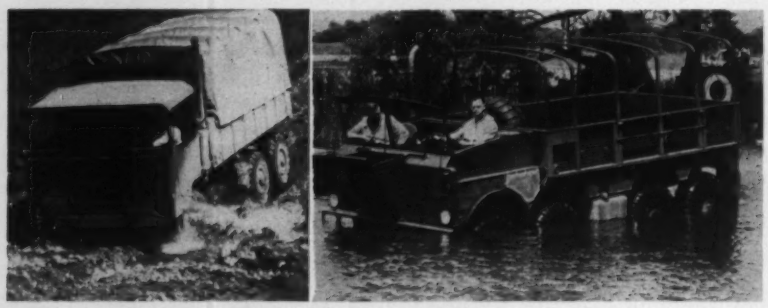
Passenger Only

	1960	1959
January	688 731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
6 Mo. Totals	3,809,578	3,284,012
July		555,410
August		239,149
September		258,151
October		507,527
November		254,527
December		494,931
Total		5,593,707

Week Ended	1960	1959
June 18	137,641	129,270
June 25	141,247	127,217
July 2	125,868	108,397
July 9	89,769	123,147
July 16	104,711†	127,502
July 23	122,000*	124,446

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Ford, GM Aim at Military Truck Market



Here are the new Ford (left) and GMC Truck & Coach Div. (right) entries in the medium, military, tactical truck market. Both operate in water and on land. Both companies have several sizes to offer

Exhaust Note . . .

• To remain competitive, automotive engineers must use computers instead of time consuming mechanical testing methods, says Prof. Robert E. Weil, Chrysler Institute of Engineering. "The automotive engineer today is faced with a rapidly advancing technology. He must be able to evaluate a design completely in a relatively short time," says Professor Weil.

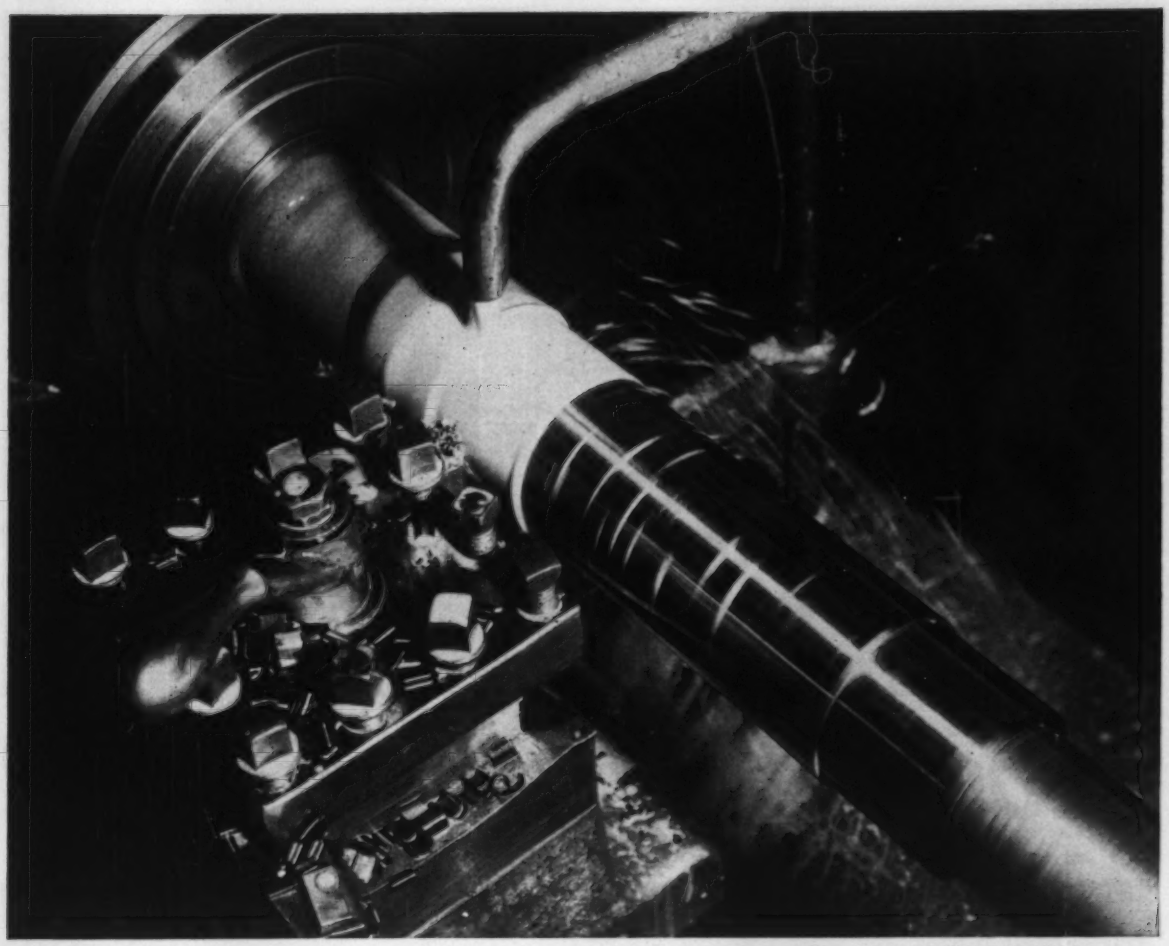


Photo courtesy Daffin Mfg. Co.

Aristoloy Leaded reduces cost 50% on drive shaft for Daffin Mfg.

Daffin engineers were skeptical when the Copperweld representative said Aristoloy Leaded* steel would reduce production costs of a 500 lb. drive shaft . . . but today savings are 50% greater compared with the steel formerly used.

Lower cost of material (an unleaded nickel alloy was formerly used), longer tool life and increased feed and speed are responsible for the savings.

The finished part reveals no detectable difference in physical properties.

And, since switching to Aristoloy, Daffin reports "uniformity of the steel has been much more consistent."

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Showed way to save $7800

RB&W fastener survey of refrigeration unit suggested that hex screws be substituted for studs ... and castings be tapped with less costly clearance fit.

When there are no special design requirements or space clearance conditions, using studs of 1-inch diameter and smaller often penalizes the user needlessly. First, in direct costs, since the more economical *hex screws* will do the job. Second, in production costs, since studs require holes tapped with an expensive *interference* thread fit.

The RB&W Man pointed this out when his survey revealed over 250 stud fastenings per refrigeration unit. For this application, 250 hex screws cost $8.45 . . . for a saving of better than $22 over the studs and nuts. Annually this would total to $7800 . . . *clear profit.* And on top of this, reduced tapping costs, too.

Want to get the most from *your* fastener dollars? Ask for an RB&W man to make a survey. Contact Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

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116th year

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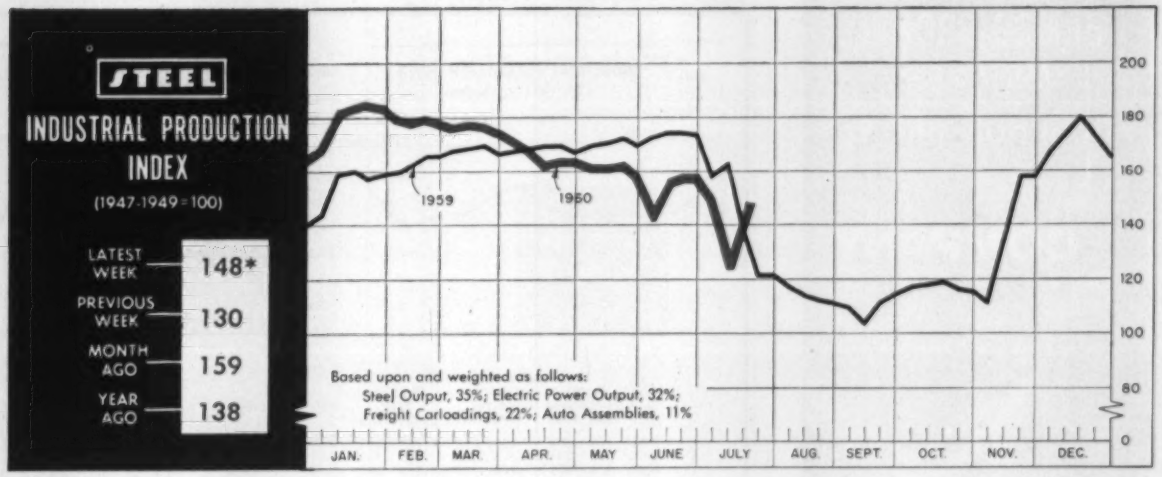
** Specifying studs for fear that hex screws might damage castings during disassemblies is based on a groundless fear. Hex screws in threaded holes with clearance fit can be reused repeatedly without damaging the casting. In the test casting shown above, the hex screws were first tightened and removed 50 times—then torqued to breaking point. Cutaway section showed casting threads were still perfect, with no sign of stripping.*



*Week ended July 16.

Index Moves Above Year-Ago Level

FOR THE FIRST TIME since mid-April, STEEL's industrial production trend line has risen above the year-ago level. That relationship may persist until yearend.

There's only one big drawback to the comparison: A year ago the steel industry was in the initial stages of its historic strike, knocking the props from under any steel-oriented barometer. The crossover (predicted in this column last week) is further emphasized by the fact that the 1960 trend line is in the recovery stages of one of the biggest Fourth of July cutbacks in the history of the series.

• **Lopsided Saucer** — Here's what you can expect over the rest of the year: The index will edge a little higher during the week ended July 23, completing the holiday recovery. Then it will level off, fluctuating within a narrow range for several weeks until automotive changeovers are completed. If there is any direction other than sidewise during this period, it is likely to be slightly on the down side, continuing the pattern of the second quarter. But then, look for a rapid rise into the fourth quarter, with the possibility of holding above the strike recovery trend line of 1959.

Result: The pattern will look like a saucer that is off center, and the 1960 average will be above that of strike-bound 1959. (The average for the first 29 weeks of 1960 was 167 per cent of the 1947-49 base period compared with 165 for the corresponding period of 1959.)

Here is the outlook for the four components of the index for the balance of this year:

• **Steel**—Operations are back up to about 55 per cent of capacity, or the same level as in late June. If July is to average out at 55 per cent, as many people predict, the last week of the month will have to see operations running above 60 per cent, which doesn't seem prob-

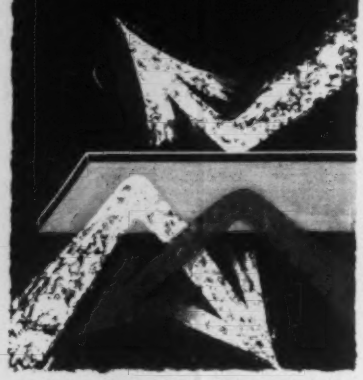
BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,556[1]	1,476	365
Electric Power Distributed (million kw-hr)	14,100[1]	13,031	13,415
Bituminous Coal Output (1000 tons)	1,260[1]	1,760	1,556
Crude Oil Production (daily avg—1000 bbl)	6 820[1]	6,831	6,858
Construction Volume (*ENR*—millions)	$601.1	$518.7	$458 6
Auto, Truck Output, U. S., Canada (*Ward's*)	132,360[1]	111,656	164,190
TRADE			
Freight Carloadings (1000 Cars)	630[1]	456	585
Intercity Truck Tonnage (changes from year ago)	−17.7%	+1.3%	+16.2%
Business Failures (Dun & Bradstreet)	271	278	237
Currency in Circulation (millions)[3]	$32,361	$32,155	$32,194
Dept. Store Sales (changes from year ago)[3]	−13%	+16%	+9%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$26,275	$24,001	$23,964
Federal Gross Debt (billions)	$285.9	$286.3	$287.1
Bond Volume, NYSE (millions)	$23.5	$20.3	$25.1
Stocks Sales, NYSE (thousands of shares)	12,996	11,816	15,558
Loans and Investments (billions)[4]	$103.3	$103.4	$104.4
U. S. Govt. Obligations Held (billions)[4]	$25.3	$25.4	$31.0
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	232.5	232 2	216.8
All Commodities[7]	119.6	119.5	119.4
Commodities Other than Farm & Foods[7]	128.3	128.4	128.2

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

BRMCO BRONZE MATCHES PHOSPHOR BRONZE

SAVES COMPANY 21%



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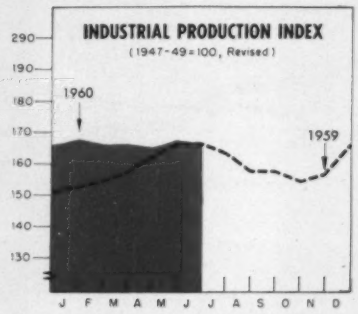
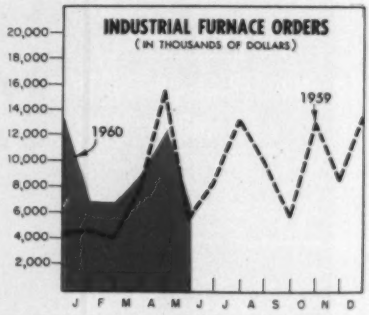
THE BUSINESS TREND





(Seasonally adjusted)

	Total Production		Total Mfg.		Durables Mfg.	
	1960	1959	1960	1959	1960	1959
Jan.	168	152	168	150	181	156
Feb.	166	155	166	153	178	160
Mar.	166	157	165	156	175	165
Apr.	165	162	164	161	172	170
May	167	166	166	165	174	177
June	166*	166	165*	166	172*	178
July	...	163	...	163	...	171
Aug.	...	157	...	156	...	158
Sept.	...	157	...	156	...	157
Oct.	...	154	...	153	...	155
Nov.	...	155	...	154	...	155
Dec.	...	165	...	164	...	174
Avg	...	159	...	158	...	164

Federal Reserve Board. *Preliminary.

	1960	1959	1958*
Jan.	6,827	4,545	3,047
Feb.	6,784	3,596	3,684
Mar.	9,033	7,842	2,871
Apr.	12,464	15,517	3,572
May	6,352	5,315	954
June	....	8,230	3,672
July	....	13,141	5,169
Aug.	....	9,738	3,533
Sept.	....	5,560	4,846
Oct.	....	12,967	3,105
Nov.	....	8,442	5,597
Dec.	....	13,437	4,284

*Does not include industrial ovens. Industrial Heating Equipment Assn. Inc.

Charts copyright, 1960, STEEL.

able at the moment.

The pickup is more likely to be of the same character as the decline—2 or 3 points a week—until the high point is reached in late November or early December. If auto production reaches the near record level predicted for it during the new model buildup, the demand for sheets should be strong enough to push the steel operating rate above the 80 per cent mark.

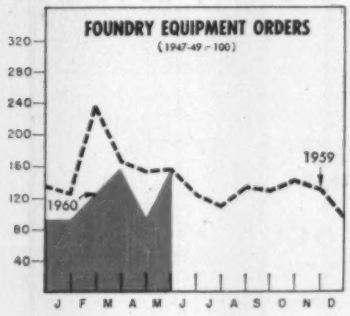
• **Autos** — Auto production last week showed a significant gain from the previous week, largely because of the reactivation of Ford Motor Co. plants shut down by a strike-induced shortage of parts. But the general trend will be down until the bottom of the changeover trough is reached, probably in late August. With four compacts coming out in the fall, it's a good bet that production will build fast in September and hold at or above the late 1959 pace throughout the fourth quarter.

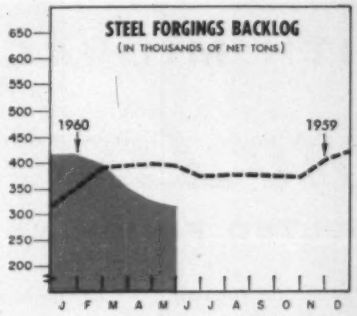
Two questions have to be answered, though:

1. Will dealers be able to clear out new car inventories—now pegged at nearly 1.1 million—in time to push 1961s to the fullest advantage? Slower than expected sales in early July may be the first sign of consumer hesitancy brought on by uncertain business conditions. (See The Business Trend, July 11, p. 65-67.) On the other hand, one ten-day selling period does not make a trend.

2. How will consumers react to the new compacts, and how will the smaller cars affect production of the larger models? Until the last couple of months, it was assumed that the compacts were borrowing sales from the standard models. Now figures indicate that registrations of imports have fallen off for two consecutive months. If compact acceptance is good and the decline in foreign registrations continues, motordom could have a whale of a fourth quarter.

• **Carloadings** — Railroad freight carloadings most likely will show some improvement in the immediate future, but little of it will be from metalworking. Agricultural products will boost the figures as one of the best wheat crops in history comes in. There may be some slight pickup in iron ore, coke, and coal loadings as steel operations pick up, but they will be offset by declines in the auto industry and manufacturing plant vacations.





	1960	1959	1958
Jan.	95.5	127.4	57.9
Feb.	128.6	237.1	57.6
Mar.	159.9	166.6	85.9
Apr.	97.9	154.2	88.7
May	159.0	157.0	136.1
June	....	125.1	87.7
July	....	110.7	77.9
Aug.	....	134.1	74.1
Sept.	....	131.3	64.5
Oct.	....	140.8	118.9
Nov.	....	131.2	83.3
Dec.	....	95.9	137.0
Avg	....	142.6	89.1

Foundry Equipment Mfrs. Assn.

	Shipments 1960	Shipments 1959	Unfilled Orders 1960	Unfilled Orders 1959
Jan.	123	113	420	353
Feb.	130	113	398	392
Mar.	138	129	356	396
Apr.	117	136	325	398
May	110	142	312	394
June	...	140	...	375
July	...	103	...	377
Aug.	...	98	...	376
Sept.	...	103	...	374
Oct.	...	97	...	373
Nov.	...	87	...	405
Dec.	...	114	...	420

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

However, the approach of fall will see a flurry of activity from iron ore and coal loadings in preparation for the winter season, and autos and metalworking generally should show the customary post-Labor Day pickup. Late harvests will add to the total, and the peak will be reached about midway through the fourth quarter. Then the usual falloff will follow the close of the Great Lakes navigational season.

• **Electric Output**—A peak-trough-peak sequence is probable for this barometer of general economic activity. The first peak will occur during August when the hot weather is at its worst. The trough comes between Labor Day and the first blast of winter—usually about the middle of November. Then there is a steady buildup to the year's high point just before Christmas. This year, that point should be just under 15 billion kw-hr per week compared with about 14.2 billion kw-hr at present.

FRB Index to Follow Pattern

The same pattern could well hold for the Federal Reserve Board's industrial production index, charted on Page 94. In setting a first half record average of 166 (1947-49 = 100), the seasonally adjusted index fluctuated in a 4 point range. Total manufacturing activity has held up well, offsetting much of the decline in production of basic metals during the last few months. If this continues, the index should not lose more than another 2 or 3 points during July and August. If the trends outlined above materialize, the FRB index should pick up starting in September and climb steadily to a peak in December.

On the other hand, some economists claim we are already in a mild inventory recession which will get worse in the second half and carry over into 1961. If they are correct, the FRB index will do well to match its present level of 166 during the fourth quarter.

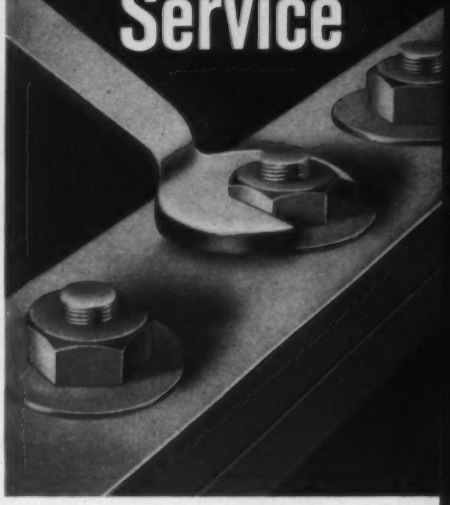
Contracts at Record Pace

During the week ended July 14, heavy construction contracts for the year to date reached $12.5 billion, slightly ahead of the record pace set in 1956, says *Engineering News-Record*.

For the second time in three weeks, contracts topped the $600 million mark.

News for
HEAVY INDUSTRY...

Tailored Customer Service



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Midvac Rolls are precision ground to a deep, black, Micro-Lustre finish... assure rolling of stainless steel, foil and precious metals free of surface imperfections. The super uniformity throughout has resulted in rolls lasting twice as long between grinds. The deep Micro-Lustre grain structure makes it possible to cut grinding time in half.

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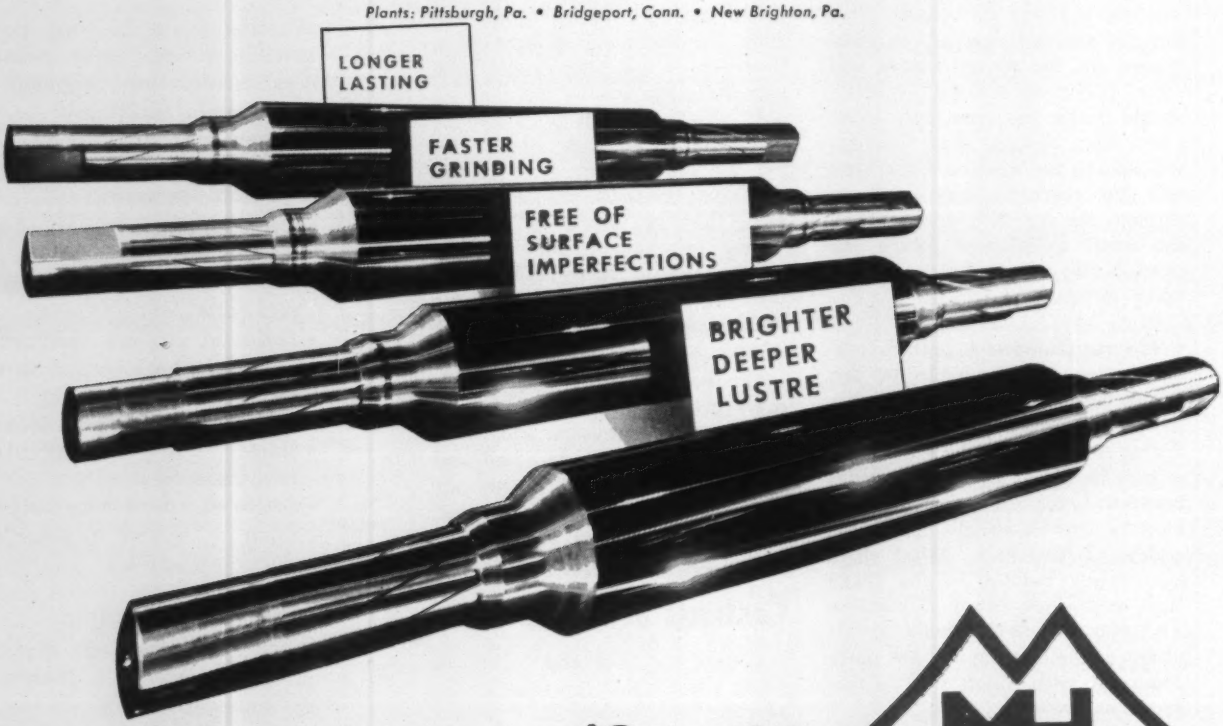
MIDVALE-HEPPENSTALL COMPANY • NICETOWN, PHILADELPHIA, PA.

SUBSIDIARY OF HEPPENSTALL COMPANY, PITTSBURGH, PA.

Plants: Pittsburgh, Pa. • Bridgeport, Conn. • New Brighton, Pa.



Midvac Rolls

MH

KENNETH W. SWARD
Weaver Mfg. gen. mgr.

ROGER M. WOLCOTT
J&L production planning dir.

GORDON PATTERSON
Yale & Towne president

RALPH GUNDERSEN
Standard Conveyor v. p.-mfg.

Kenneth W. Sward was made general manager, **Weaver Mfg. Co.**, division of Dura Corp., Detroit. He succeeds **Eugene A. Costa**, resigned. He was executive assistant to the general manager. **Edward S. Northup** was made assistant to Mr. Sward.

Roger M. Wolcott was made director of production planning programs for **Jones & Laughlin Steel Corp.**, Pittsburgh. He succeeds **Howard E. Robinson**, recently made assistant to the president.

Henry K. Watson II, vice president-treasurer, **Watson Standard Co.**, Pittsburgh, was elected president to succeed his father, **Joseph D. Watson**, elected chairman. **William L. Otto** was elected assistant vice president and controller.

Ernest Breech resigned as chairman of **Ford Motor Co.**, Dearborn, Mich., and was given the newly created post of chairman of the Finance Committee. **Henry Ford II**, president, will also serve as chairman.

James F. Magin, a vice president of **Square D Co.**, and general manager of the Industrial Controller Div., Milwaukee, was made manager of the firm's foreign subsidiaries. **Paul A. Christenson**, division works manager, was named to succeed Mr. Magin as division manager.

Frank B. Didier was named vice president and treasurer of **Fort Wayne Metals Inc.**, Ft. Wayne, Ind. He was comptroller.

Gordon Patterson, former president of Square D Co., was elected president of **Yale & Towne Mfg. Co.**, New York. He succeeds **Gilbert W. Chapman**, retired. Mr. Patterson resigned from Square D in April.

Frank P. Iapalucci was made vice president-manufacturing, **Lake Erie Machinery Corp.**, Buffalo, subsidiary of the new Bell Intercontinental Corp. (successor to Bell Aircraft Corp.). **James F. Connaughton**, president of Bell Intercontinental, continues as president of Lake Erie Machinery, and **Elmer A. Rich** continues as vice president-general manager. Mr. Connaughton also will be chairman, succeeding **Leston Faneuf**.

Alonzo G. Decker Jr. was elected president, **Black & Decker Mfg. Co.**, Towson, Md., to succeed **Robert D. Black**, who remains chairman and chief executive officer. **W. Griffin Morrel**, vice president of Chesapeake & Potomac Telephone Co. of Maryland, succeeds Mr. Decker as executive vice president, effective Aug. 1.

Leonard H. Davis was elected executive vice president of **Gabriel Co.**, Cleveland. He was vice president and general counsel.

Thomas M. Sweeney was appointed field sales manager, Tools Div., **J. H. Williams & Co.**, Buffalo. **Edward R. Burkardt** is vice president, tool sales.

Taylor S. Iams was made Pittsburgh area sales representative for **Macklin Co.**, Jackson, Mich.

Ralph Gundersen was made vice president-manufacturing, **Standard Conveyor Co.**, North St. Paul, Minn. He was plant manager. **W. A. Rundquist**, sales promotion manager, was made vice president-sales, succeeding **Edward Boberg**, resigned, but chosen to represent the firm as sales supervisor for Texas. He maintains headquarters in North St. Paul. **D. G. Tregilgas** was made sales promotion manager, succeeding Mr. Rundquist.

Wallace Macgregor was appointed president of **Climax Molybdenum Co.** and elected vice president of American Metal Climax Inc., New York, parent company. In his post as president of Climax Molybdenum Co., effective Aug. 1., he succeeds **Frank Coolbaugh**, AMAX president.

Walter A. Cusick was named assistant superintendent-sheet mills at the Bridgeville, Pa., plant of **Universal-Cyclops Steel Corp.** **John L. Ballantyne** was made assistant superintendent - Wide Band Dept., Bridgeville, and **Walter M. Rudolph Jr.** was made plant industrial engineer.

Dr. Martin Schilling was made vice president-engineering and research for **Raytheon Co.**, Waltham, Mass. He was vice president-government programs and planning. He succeeds **Dr. I. A. Getting**, who resigned to become president of the newly formed Aerospace Corp., the Air Force-funded, nonprofit organization.

Maurice Muser Jr. was appointed treasurer, **Edgcomb Steel & Alumi-**

JAMES OAKLEY

CARL V. SCHROEDER

Clayton Mark & Co. executive posts

JOHN GLASS

MICHAEL RADNOR

managers of Tann Corp. subsidiaries

num Corp., Hillside, N. J., to succeed C. K. Munn, retired.

James Oakley was made director of manufacturing; **Carl V. Schroeder** purchasing agent for **Clayton Mark & Co.**, Evanston, Ill. Mr. Oakley was manufacturing manager for Crane Co. from 1957 until early this year. In recent months, he was on a special production assignment in England for Borg-Warner Corp. Mr. Schroeder was purchasing director-brass products for American Standard Co.

Dr. Karl Eklund was made director of research and applied ion physics of **Radiation Dynamics Inc.**, Westbury, N. Y. He was with the Pegram Nuclear Physics Laboratories of Columbia University.

Robert L. Reed was made general sales manager, **Union Carbide Metals Co.**, division of Union Carbide Corp., New York. He will remain in Pittsburgh until September. He was manager of the Pittsburgh region.

Tann Corp., Detroit, appointed two vice presidents-general managers of subsidiary companies set up to manufacture new products. **John Glass** heads Tann Bearing Co. and **Michael Radnor** heads Tann Controls. Mr. Glass formerly was vice president-general manager of Studrive Inc. Mr. Radnor was a senior manufacturing engineer, Small Motors Div., Westinghouse Corp.

Herbert T. Florence was elected president and general manager, **Cleveland Crane & Engineering Co.**, Wickliffe, Ohio. He succeeds **Charles F. Safreed**, now chairman. **William J. Ryan** was made vice president and assistant general manager. **Ralph Ford**, plant superintendent, was also made assistant secretary.

Jack J. Kerns was made director of purchasing; **James E. Kerns** general purchasing agent of **Selas Corp. of America**, Dresher, Pa., both newly created posts. In addition to heading the Purchasing Div., Jack Kerns will participate in purchase of engineered and technical materials, equipment, and services. James Kerns is responsible for general purchasing and administrative procedures.

Edward L. Mahoney was made director of sales, Industrial Div., **Columbus Coated Fabrics Corp.**, Columbus, Ohio. He was sales director, Vinyl-Metal Products Div., and continues to direct the vinyl-metal laminate program.

Dr. Philip Cooperman was appointed director-research and development, **Research-Cottrell Inc.**, Bound Brook, N. J. He succeeds **Dr. Harry J. White.**

Vincent R. Troglione was elected president of **Sunbeam Equipment Corp.**, Meadville, Pa. He was vice president-general manager, Meadville Industrial Furnace Co. He succeeds **H. C. Gwinn**, named chairman.

George A. Allison was made general superintendent, Electrolytic Div.,

ROBERT L. REED

UMC gen. sales mgr.

HERBERT T. FLORENCE

Cleveland Crane & Eng. pres.

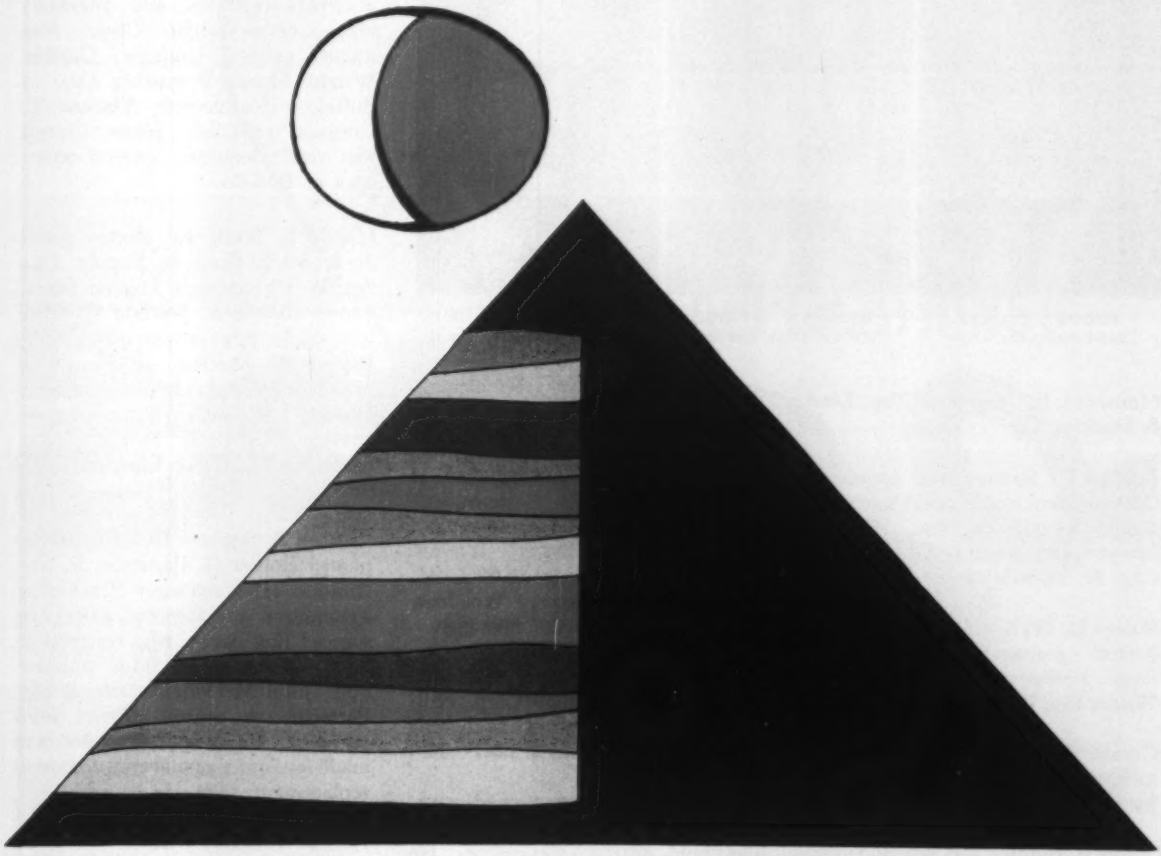
JACK J. KERNS

Selas purchasing dir.

VINCENT R. TROGLIONE

Sunbeam Equipment pres.

You'll put permanence into products with Western Brass because brass is tough to start with... because time, use and environmental attack only mellow it. But whether you use brass for strength or appeal, your product calls for an individual alloy, temper, gauge and finish. Count on Western Brass to recommend and produce exactly the right one. (It will even arrive in boxes specially adapted to your handling methods.) You'll make it better with durable brass. You'll make it best with "tailor-made" Western Brass.

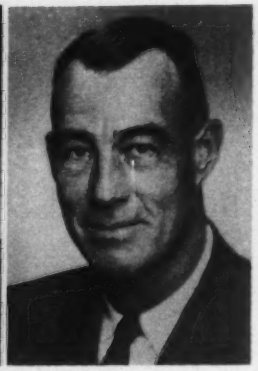


OLIN MATHIESON • METALS DIVISION • EAST ALTON, ILL., NEW HAVEN, CONN.

Western BRASS

JAMES H. W. CONKLIN
Stanley Steel Strapping sales

ALBERT J. SMITH
McKay Co. v. p.



R. C. CONOVER
Porter-Refractories wks. mgr.

JEROME L. STRAUSS
Budd Electronics v. p.

WILLIAM C. WRIGHT
SKF gen. mgr.-Altoona

RAYMOND F. NEILL JR.
Conoflow purchasing agent

Monsanto, Ill., **American Zinc, Lead & Smelting Co.**

Jerome L. Strauss was appointed vice president and general manager, **Budd Electronics Inc.** (former Lewyt Mfg. Corp.) Long Island City, N. Y., subsidiary of Budd Co.

Robert D. Wylie was named quality control manager, Manufacturing Dept., Barberton, Ohio, **Babcock & Wilcox Co.**, Boiler Div.

Gerald R. Garinger was promoted to branch manager at Indianapolis for **Carpenter Steel Co.**

Glenn F. Bradley was named superintendent of operations, Listerhill, Ala., reduction plant, **Reynolds Metals Co. Richard E. Cole** was named assistant plant manager, St. Lawrence aluminum reduction facility at Massena, N. Y.

Leonard J. Lindstrom was appointed manager of engineering and research, **Despatch Oven Co.**, Minneapolis.

William C. Wright was named to the new post of general manager, Altoona, Pa., Div., **SKF Industries Inc.** He is succeeded as production manager by **James A. Graham**, former plant manager, Philadelphia. **Stanley Kabala**, former Altoona plant manager, was made Philadelphia plant manager; **Woodrow Wilson**, Altoona plant manager.

Raymond F. Neill Jr. was made purchasing agent, **Conoflow Corp.**, Philadelphia, subsidiary of Walworth Co. He has been buyer since 1958.

G. Keith Shook was named manager of **Aluminum Co. of America's** Cleveland district sales office. He succeeds **James A. McGowan**, named assistant general manager of field sales for Alcoa and has offices in Pittsburgh.

Walter L. Scott Jr. was made superintendent; **Raymond L. Crowe** assistant superintendent, No. 3 seamless tube mill, Indiana Harbor Works, East Chicago, Ind., **Youngstown Sheet & Tube Co.**

James H. W. Conklin was made general sales manager, **Stanley Steel Strapping Div.** of Stanley Works, New Britain, Conn. He was general sales manager of Pratt & Whitney Co. Inc.

Albert J. Smith was elected vice president, **McKay Co.**, Pittsburgh. He is in charge of Electrode Div. sales.

R. C. Conover was named general works manager, Refractories Div., Pittsburgh, **H. K. Porter Company Inc.** He was Western district works manager for the division.

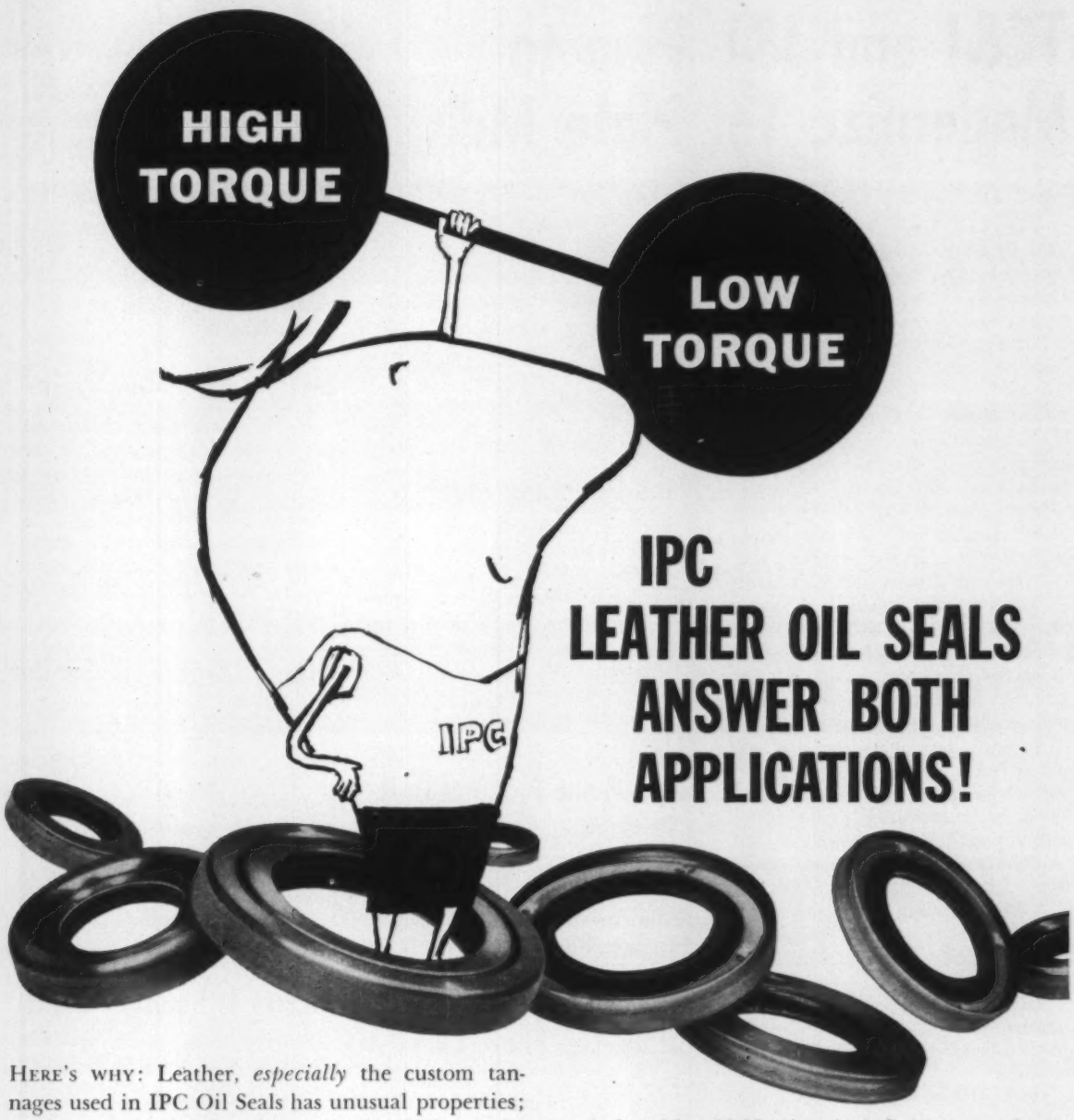
Stanley B. Kurzina Jr., vice president-manufacturing and engineering, Curtiss-Wright Corp., was named general manager, **Curtiss-Wright Metals Processing Div.** in Buffalo. He succeeds **Vincent T. Gorguze**, resigned. **James Cowell** was made assistant general manager at Buffalo.

Harold E. Stack was elected president, **Stack Steel & Supply Co.**, Seattle. He succeeds **Eugene Stack**, named chairman. **Sterling W. May** was made vice president-treasurer; **Wayne F. MacRae** assistant vice president-general sales manager; **Charles J. Gorsich** director of purchasing; **William R. Beck** manager-Order Dept.; **H. L. Linerud** secretary.

Lamson & Sessions Co., Cleveland, named **Robert G. Patterson Jr.** distributor sales manager (including automotive replacement sales) to succeed **Ray Burns**, who resigned to join an automotive trade publication. **John McDonald** succeeds Mr. Patterson as central district sales manager. **Richard C. Browder** was made assistant manager-automotive replacement sales.

Carl B. Klockars fills the new post of assistant manager-machine tool sales, **Taft-Peirce Mfg. Co.**, Woonsocket, R. I., responsible for sales promotion.

John C. Fedoruk was made technical director, General Chemical Div., **Allied Chemical Corp.**, New York. He succeeds **Dr. Howard Hurmence**, recently named assistant director-research and development for the corporation.



IPC LEATHER OIL SEALS ANSWER BOTH APPLICATIONS!

HERE'S WHY: Leather, *especially* the custom tannages used in IPC Oil Seals has unusual properties; . . . for example it offers dimensional stability, *and a great torque range* . . . with the result that IPC Leather Oil Seals meet torque conditions from minimum up to 2-3 times normal.

IPC Leather Oil Seals have high abrasion resistance . . . are ideal for slow speed applications on rough shaft finishes (up to 60 micro-inch). Where higher speeds are a factor, IPC Leather Seals are performing well at speeds up to 2000 feet per minute . . . on shafts with a 24-32 micro-inch finish . . . and temperatures up to 248° F.

How about low friction? . . . The IPC Leather Oil Seal has a distinctive edge . . . can be furnished with numerous types of treats or impregnates tailored to solve your specific problem.

Why not look into IPC Leather Oil Seals soon? This custom approach to sealing problems is your best assurance of quality.

Packings
Oil Seals
Precision Molding

IPC **INTERNATIONAL PACKINGS** CORPORATION

Custom designed . . . for your application.

Bristol, New Hampshire P-6

TC&I and J&L Plan to Modernize Tin Plate Mills

TIN PLATE mills are being modernized to meet consumer demands: Uniformity, conformance to quality standards, thinner and wider specifications, and products in coil form.

• **Tennessee Coal & Iron Div.**, U. S. Steel Corp., has launched an extensive modernization program at its Fairfield, Ala., tin mill.

Installation of a six stand, 52 in., cold reduction mill will be started immediately. It will replace the two, five stand mills that have been in use since the tin mill was completed in 1938. It will be capable of cold reducing steel for tin plate at speeds in excess of 1.25 mile a minute, or about three times the top speed of present facilities.

A continuous annealing line replaces box annealing equipment. It will enable TC&I to enhance its position as a producer of tin plate and to meet the requirements of can manufacturers for tailormade quality.

A 54 in. pickling line replaces two lines and incorporates facilities to produce quality tin plate products and to process wider materials.

A 56 in., high speed, heavy duty temper mill will provide improved flatness and temper of tin plate products.

Coupled with the addition of the cold reduction facilities at the tin mill are expanded annealing facilities at Fairfield sheet mill of TC&I. This phase of the program will enable the division to improve the surface condition of sheet products.

• **Jones & Laughlin Steel Corp.** is increasing facilities for the shipment of tin plate in coils at its Aliquippa (Pa.) Works. A coil packaging line, new heavy duty tractors, and truck loading equipment are being installed and extensions and changes to truck and railroad loading docks are being made. Additional equipment will be installed later.

Coils weighing up to 20,000 lb now comprise a large portion of J&L's tin plate orders. Tin plate coils are shipped in a position different from that usually used for coils, company officials say. The large coils are placed on pallets with the core or "eye" vertical; previously, smaller coils were shipped in an upright position on platforms with the "eye" horizontal.

Plans Detinning Plant

M&T of Canada Ltd. (formerly Metal & Thermit-United Chromium of Canada Ltd.), Toronto, Ont., will build a detinning plant in Canada. Operations are scheduled to start next year. The project will involve a chemical processing plant for reducing tin plate scrap to tin or tin chemicals and high grade steel scrap.

Forms Home Products Unit

Rheem Mfg. Co., New York, has organized a Home Products Group and appointed V. J. Heinis group vice president. He will supervise operation of the Richmond Plumbing Fixtures Div., Ruud Mfg. Co., and the Rheem Home Products Div.

Installs Die Shear Line

Caine Steel Co., Chicago, has installed a $125,000 McKay die shear line as part of its long range, $1 million expansion program. The unit will enable Caine customers to purchase coil steel in the most economical size and have it cut to length and slit to width.

Four Firms Change Names

Avondale Marine Ways Inc., New Orleans, changed its name to Avondale Shipyards Inc.

Fullerton Steel & Wire Co., Chicago, changed its name to Fullerton Metals Co.

Brooks Rotameter Co., Lansdale, Pa., changed its name to Brooks Instrument Co. Inc. The company is primarily a manufacturer of flow measurement meters and its expansion program includes a 7000 sq ft addition to its Hatfield, Pa., plant.

Midco Pipe & Tube Inc. is the new name of Midcontinent Tube Service Inc., 2120 Lee St., Evanston, Ill.

Vulcan Iron to Move

Vulcan Iron Works will move its facilities from Chicago to Chattanooga, Tenn., Nov. 1. The firm makes pile driving and road building equipment.

Installs Enameling Unit

A. O. Smith Corp., Milwaukee, has placed in operation its new 140 ft long porcelain enameling furnace. The unit has an hourly capacity of 24,000 lb gross and 13,500 lb net production. It was designed and installed by the Industrial Div., Lindberg Engineering Co., Chicago.

Orders Large Roll Grinder

United Engineering & Foundry Co., Pittsburgh, has ordered a new grinder from Farrel-Birmingham Co. Inc., Ansonia, Conn. The unit will be able to handle rolls as heavy as 175 tons, measuring from 11 in. to 81 in. in diameter and up to 30 ft in length. The grinder is expected to be in operation at United's Vandergrift, Pa., plant early in 1961.

Square D Enlarges Plant

Square D Co., Detroit, has added 68,400 sq ft of space to its Lexington, Ky., plant. This raises the plant's area to 238,000 sq ft and lifts the firm's total factory space to more than 2 million sq ft, an increase of nearly 70 per cent since the company's $30 million expansion program began ten years ago. Square D makes electrical distribution and control equipment.

Bell Aerospace Organized

Bell Aerospace Corp. has begun business in Buffalo as a wholly owned subsidiary of Textron Inc. The new firm is composed of three defense units which Textron purchased from the former Bell Aircraft Corp. The units are: Bell

(Please turn to Page 107)

At ease... with a lot of tension

This man is strapping coils of steel with a Signode air-powered PN tool that takes 1¼" strapping directly from the dispenser. No waste strap. There is plenty of tension at his fingertips—up to 1600 pounds at 90 p.s.i. Action of the PN is fast, easy, powerful, dependable. Seals are applied quickly and positively with the air-powered N1435 tool at left. The portable Model DM1 tool stand and dispenser shown in the foreground saves additional time and effort.

This combination of tools and accessories, widely used in steel mills, is just one example of Signode's capability and interest in helping make your product cost less to package, handle, and ship. For more information, write for free copy of "Air Power Tensioners and Sealers."

First in steel strapping

SIGNODE STEEL STRAPPING CO.

2645 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
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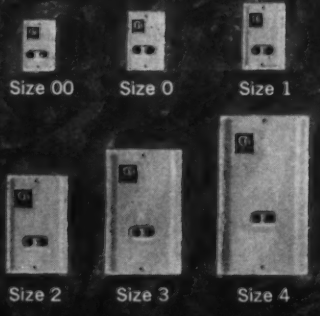
Smaller! About 20% smaller than Size 0 Starters. Just 5 3/4" wide, 7" high and 4 3/16" deep.

Convertible! Carried in stock with three cover options or easily converted in field from "reset" only to "start and stop-reset" or "three-position selector switch." Kits at optional cost.

Broad line!



A new addition to the famous three star line

New! Save space and money with Cutler-Hammer's Size 00 A-C Magnetic Starter

Takes up to 20% less space... costs 18% less than Size 0 Starters. Now you get two big new bonuses in control selection . . . less space and less money Both with the all new Size 00 Starter.

Before, you had to use a larger starter in applications where it really wasn't needed. But, now you can use the Size 00 in about 40% of the applications where the Size 0 is usually used.

The new Cutler-Hammer Size 00 Starter performs to the same high standards you get from all Cutler-Hammer Starters. And, you still get vertical, dust-free contacts which add so much to more reliable starter performance. Your choice too, of 2-coil or 3-coil overload protection in the same small enclosure.

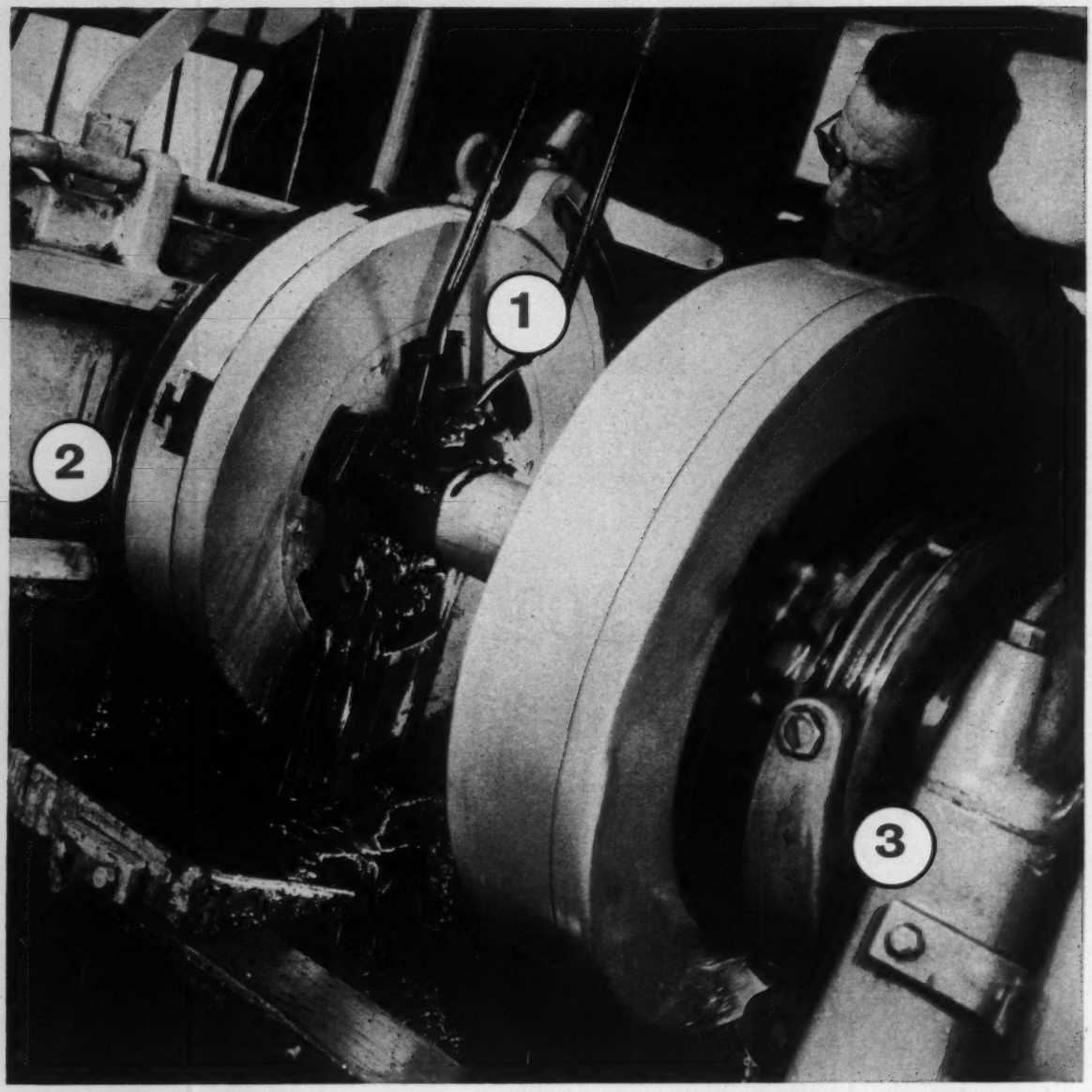
The Bulletin 9586 Size 00 Starter can be used on any general application. Its maximum horsepower ratings: Three phase: 208/220 volts, 1½ hp. 440/550 volts, 2 hp. Single phase: 115 volts, ⅓ hp. 230 volts, 1 hp. It's available open or in NEMA 1 enclosure. Send for Pub. LO-40-N213.

Why you get more from Cutler-Hammer. New things are happening at Cutler-Hammer—new, better products, new engineering ideas and talent, new plant capacity. We're on the move. And, we'd like to show you how we could help you in any electrical control problem. Contact the nearest Cutler-Hammer distributor.

WHAT'S NEW? ASK...

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler Hammer International, C. A. Associates: Canadian Cutler-Hammer, Ltd., Cutler-Hammer Mexicana, S. A



ESSO LUBES HELP BOOST CUTTING EFFICIENCY

1. PENNEX® cutting oils, compounded with fatty materials, are widely used to boost cutting efficiency in threading, tapping and other machining operations on ferrous metals. Featuring high sulfur activity which provides excellent surface finish and low tool wear, Pennex cutting oils have been proven performers over many years.

2. NUTO® hydraulic and circulating oils are inhibited for oxidation and rust protection. They resist foaming and have a high viscosity index for hydraulic uses. They also serve efficiently in gear drives, bearings, and circulating systems.

3. NEBULA® EP multi-purpose grease replaces many single-purpose greases: provides high oxidation stability for long service; lubricates efficiently under high temperature conditions; serves *all* grease-lubricated points, including those where extreme-pressure properties are required.

For further information about Esso lubricants, contact your local Esso office or write: Esso Standard, Division of Humble Oil & Refining Company, 15 West 51st Street, New York 19, New York.

Esso

In Industry after Industry..."ESSO RESEARCH works wonders with oil"

(*Concluded from Page 102*)

Aerosystems Co., Bell Helicopter Co., and Hydraulic Research & Mfg. Co. Officers of Bell Aerospace Corp. are: President and treasurer, Harvey Gaylord; vice president-government relations, G. B. Clark; secretary, M. O. Damon; and assistant treasurer, T. B. Healy Jr.

Buys Welding Equipment

Reynolds Metals Co., Richmond, Va., has launched a long range program to equip all of its aluminum foil manufacturing facilities with ultrasonic seamwelding equipment. A second foil seamwelder has been ordered from International Ultrasonics Inc., Rahway, N. J., in the first step to implement the program, says F. L. Eichner, general manufacturing manager of Reynolds' Foil Div.

Forms Mexican Subsidiary

Bendix Corp., Detroit, acquired a controlling interest in Disenadores y Constructores SA, one of Mexico's leading tool and die firms. The name of the Mexico City firm is being changed to Bendix de Mexico SA.

Acquires British Affiliate

Barden Corp., Danbury, Conn., purchased a 50 per cent stock interest in E. M. O. Instrumentation Ltd., Bracknell, Berkshire, England. Both firms produce precision ball bearings.

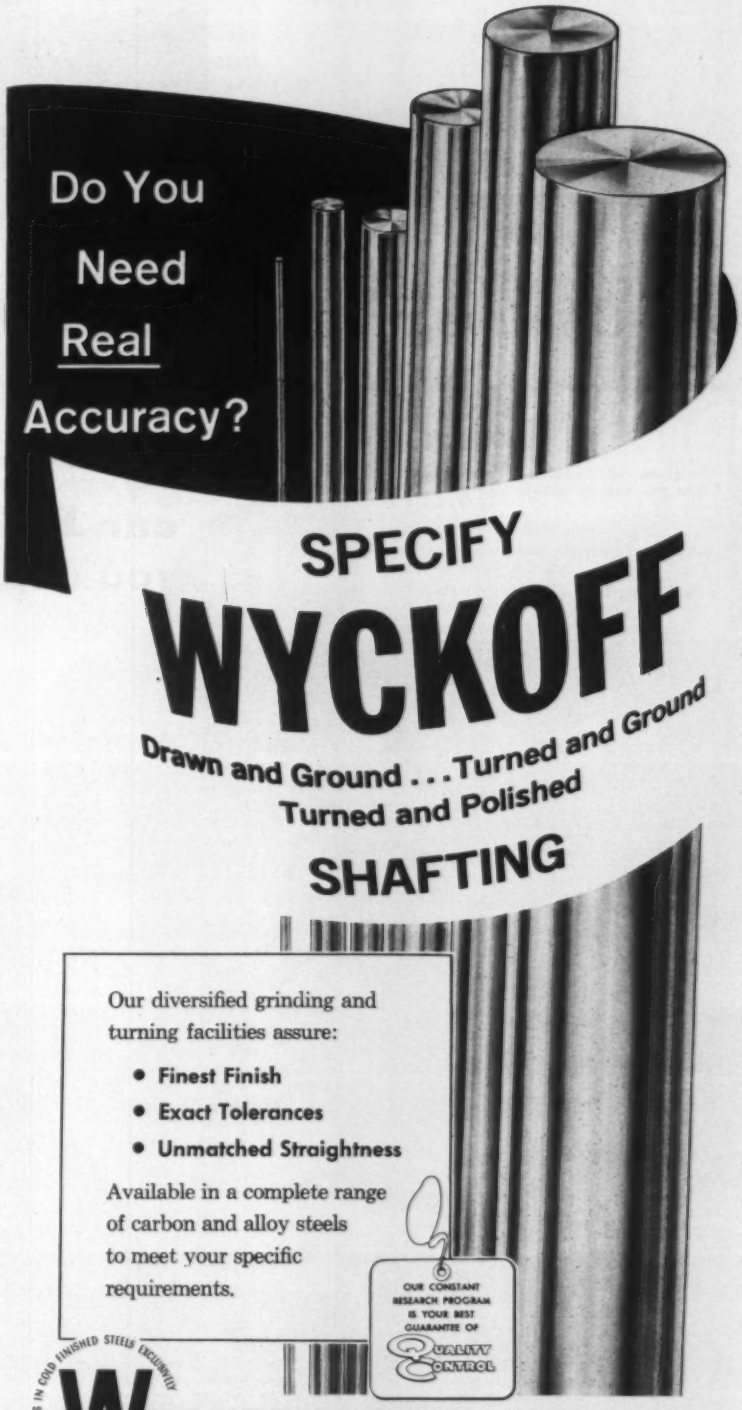
Wiedemann Enlarges Plant

Wiedemann Machine Co., King of Prussia, Pa., has broken ground for a plant addition that will increase plant capacity by 30 per cent.

Gets Steel Mill Contracts

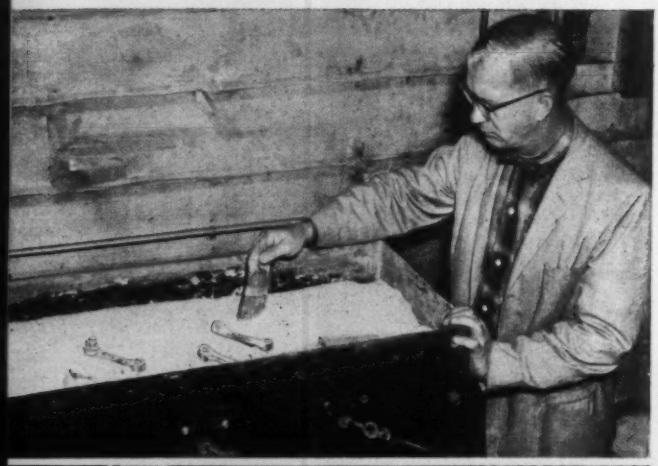
Pittsburgh Engineering & Machine Div., Textron Inc., Pittsburgh, is building slab shearing, conveying, and piling equipment for a blooming mill at the Brier Hill Works of Youngstown Sheet & Tube Co., Youngstown. The division is also building slab handling facilities for the No. 2 blooming mill at the Campbell Works. The orders are part of a multimillion dollar expan-

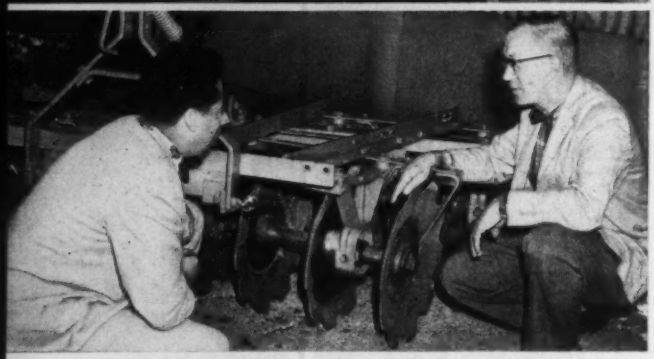
(*Please turn to Page 110*)


Do You
Need
Real
Accuracy?
SPECIFY
WYCKOFF
Drawn and Ground . . . Turned and Ground
Turned and Polished
SHAFTING
Our diversified grinding and turning facilities assure:
• Finest Finish
• Exact Tolerances
• Unmatched Straightness
Available in a complete range of carbon and alloy steels to meet your specific requirements.
OUR CONSTANT RESEARCH PROGRAM IS YOUR BEST GUARANTEE OF QUALITY CONTROL
SPECIALISTS IN COLD FINISHED STEELS EXCLUSIVELY
WYCKOFF STEEL COMPANY
GENERAL OFFICES:
Gateway Center, Pittsburgh 30, Pa.
Branch Offices in Principal Cities
Works: Ambridge, Pa., Chicago, Ill., Newark, N. J., Putnam, Conn.
Steel
WYCKOFF STEEL PRODUCTS • Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Large Squares • Wide Flats up to 12¾" x 2¼" and 14" x 1¼" • All types of Furnace Treated Steels including Carbon Corrected Steels

Allis-Chalmers uses **RYKON** *Grease in bearing shield—offers farmers better disc harrow*

can **RYKON** Grease help you improve your product?





Above: Maynard Walberg sweeps sand back over disc harrow bearings on test stand. RYKON Grease is undergoing 2,000-hour test in this simulation of actual farm service conditions.

Below: Allis-Chalmers disc harrow ready for shipment from the plant gets inspection from Standard's Fred Parkinson and Walberg.

Maynard Walberg, Allis-Chalmers project engineer, and Standard Oil lubrication specialist Fred Parkinson, examine disc harrow bearing assembly. Fred is well equipped through training and experience to help industrial customers with lubrication problems. He has been doing this work for 11 years at Standard. He has a degree in chemistry and engineering from Brown University. Plus that, he has completed the Standard Oil Sales Engineering School.

Situation: Bearings of a disc harrow in service are always turning in dusty conditions, oftentimes completely covered with soil. Such bearings in the Allis-Chalmers harrow are protected with grease-coated rubber shields. The grease guards against dirt getting past the shield and into the bearing.

What was done: Allis-Chalmers project engineer in the LaCrosse, Wisconsin plant, Maynard Walberg, called Fred Parkinson, Standard Oil lubrication specialist, for a sample of RYKON Grease. In conditions simulating field service, RYKON Grease was tested. Bearings were rotated in the most abrasive dirt available—Mississippi sand with a high quartz fraction.

What happened: Tests were started and run to destruction. Prior to the use of RYKON Grease, bearing failures occurred at 500 hours. On switching to RYKON Grease, these tests were pushed to 2,000 hours. At this point, tests were stopped. Bearings were still in operating condition.

What you can do: Find out how RYKON Grease might help you offer your customers a better product. Inquire of the Standard Oil lubrication specialist nearest you anywhere in the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 So. Michigan Ave., Chicago 80, Ill.**

STANDARD

You expect more from STANDARD and you get it!

Quick facts about
RYKON

- Heat stable. At sustained high temperatures RYKON Grease remains soft and grease-like.
- Resistant to water-washing.
- Mechanically stable. Minimum change in consistency in service.
- Resistant to oxidation. Thickener acts as an inhibitor.
- Exceptional rust-preventive properties.

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(*Concluded from Page* 107)

sion program that includes blooming and slabbing mill equipment, hot strip mill equipment, and cold finishing mill equipment.

ASSOCIATIONS

Berniece Burkhardt has been appointed executive secretary of the **National Barrel & Drum Association**, Washington.

Dr. S. L. Fawcett has been appointed manager of the Physics Department of **Battelle Memorial Institute**, Columbus, Ohio.

Instrument Society of America, Pittsburgh, has named Ira S. French director of public relations. W. H. Kushnick is executive director.

NEW PLANTS

American Metal Climax Inc., New York, will construct a $7 million plant in Vicksburg, Miss., to produce nitrate of potash and chlorine. It will be operated by Southwest Potash Corp., a division of American Metal Climax.

American Can Co., New York, will construct a 60,000 sq ft warehouse for its Canco Div. in Coloma, Mich.

Inland Steel Products Co., Milwaukee, opened its $280,000 manufacturing plant in Fremont, Calif., replacing smaller facilities at Hayward, Calif.

American Potash & Chemical Corp., Los Angeles, plans to construct an electrolytic manganese metal manufacturing plant at Aberdeen, Miss. The $5 million facility will have an initial annual capacity of 10 million lb. It will be adjacent to the firm's sodium chlorate plant which was completed early in 1959 and is undergoing a 50 per cent expansion.

Electric Autolite Co., Toledo, Ohio, is erecting an electric parts plant at Decatur, Ala. Investment in the plant will be between $6 million and $7 million, says J. J. Bohmrich,

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It's easy to make accurate selections with the STEELECTOR Program. The three STEELECTOR cards—covering general purpose tool steel applications, hot work applications, and high speed grades—show at a glance the comparative properties of tool steel grades that will suit 96% of all tool steel applications listed in the A-L Tool Steel Handbook.

The STEELECTOR cards use bar graphs to make it easy to make precise comparisons of abrasion resistance, toughness, size stability, machinability, and red hardness. All you have to do is pick the grade with the particular combination of properties you need for the job at hand.

For each grade, there is a Data Stock List that tells you the exact analysis of the grade, its basic properties, typical applications and their working hardnesses, and temperatures for hardening, tempering, and annealing. And the complete range of available sizes and shapes is listed.

You can count on getting quality tool steel by using the STEELECTOR Program. Each STEELECTOR grade has been selected from the complete line of Allegheny Ludlum Tool Steel and made under the exacting quality control standards of all A-L products.

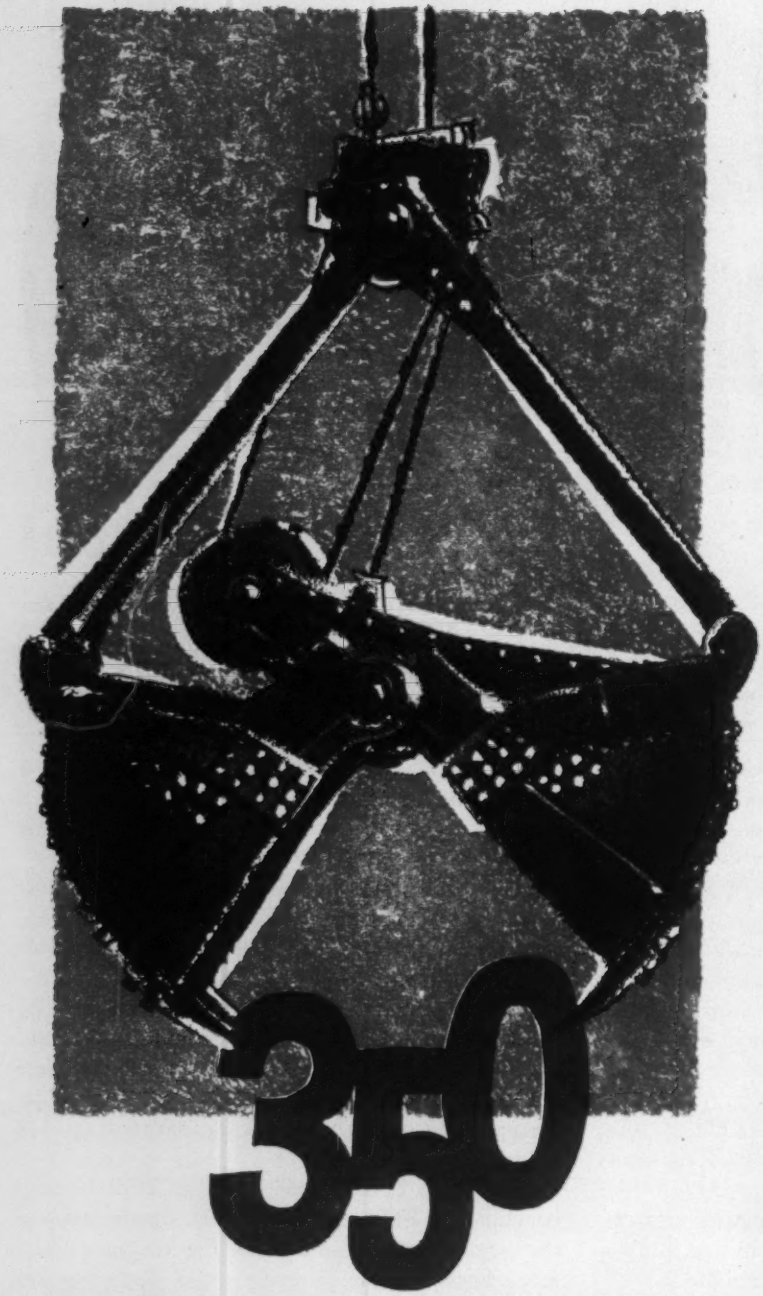
The new A-L Tool Steel STEELECTOR booklet contains the STEELECTOR Cards, descriptions of the various grades, and explains the individual Data Stock Lists available for every grade. For your own copy ask your Allegheny Ludlum sales representative, or write: *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania. Address Dept. S-7-2*

STEELECTOR PROGRAM

ALLEGHENY LUDLUM

Tool Steel warehouse stocks throughout the country

2084



sizes and types make this the most complete line of Clamshell Buckets anywhere. Write for free illustrated catalog. Blaw-Knox Equipment Division, Pittsburgh 38, Pa.

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Clamshell Buckets

vice president. The plant will produce regulators, distributors, solenoid switches, relays, governors, condensers, and related automotive and industrial products.

Acme Industries Inc., Jackson, Mich., is constructing a 100,000 sq ft branch plant at Greenville, Ala. The firm makes air conditioning and refigeration systems.

Magnetics Div., Automation Industries Inc., Manhattan Beach, Calif., has opened a 12,000 sq ft plant at 1090 Mills Way, Redwood City, Calif. The new facility produces transformers, power supplies, solenoids, focusing coils, and electromagnets.

CONSOLIDATIONS

Production Machinery Corp., Mentor, Ohio, acquired **Rathbun-Jones Engineering Co.**, Toledo, Ohio, builder of stationary powerplants and steel processing machinery. The firm specializes in continuous lines for the annealing, coating, cleaning, pickling, slitting, shearing, and other processing of metal in strip form.

Westeel Products Ltd., Hamilton, Ont., acquired **P. Graham Bell Associates Ltd.**, Georgetown, Ont., and **Columbia Metal Rolling Mills Ltd.** with plants in Vancouver, B. C., Winnipeg, Man., and Toronto, Ont. The Bell firm specializes in enameled building products. Columbia rolls metals and has prefected a new method of colorcoating aluminum and steel in the field.

Lamson Corp., Syracuse, N. Y., acquired **James A. McKechnie Ltd.**, Toronto, Ont., manufacturer of conveyors.

American Machine & Foundry Co., New York, purchased **Robert Legg Ltd.** with plants in Andover, Hampshire, and London, England. The Legg company makes tobacco machinery.

Bristol Co., Waterbury, Conn., a subsidiary of American Chain & Cable Co. Inc., New York, acquired **Hanson-Gorrill-Brian Inc.**, Glen Cove, N. Y. The business will be

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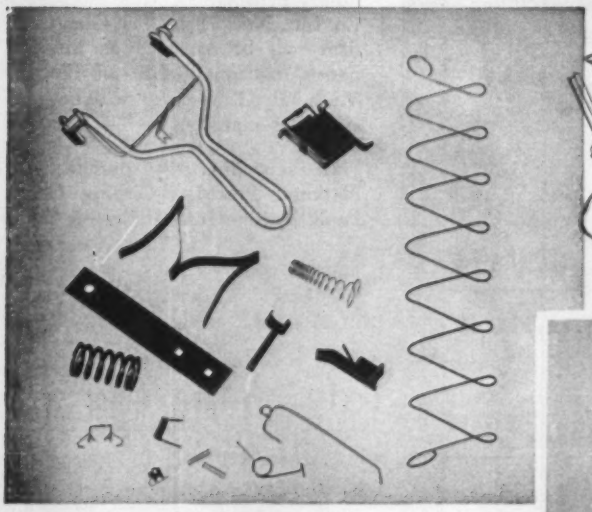
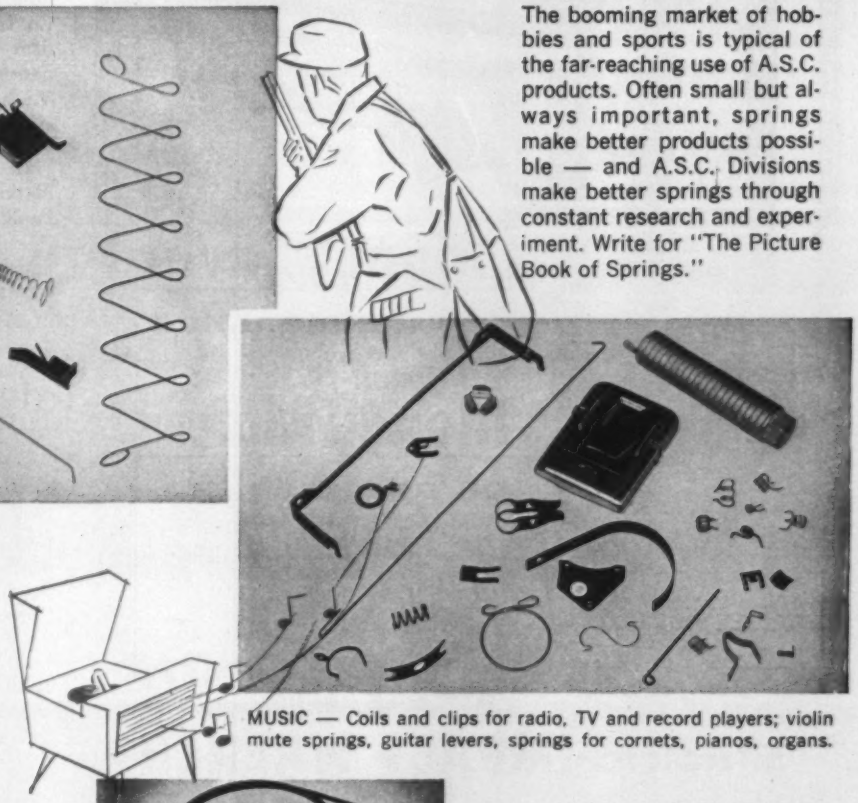
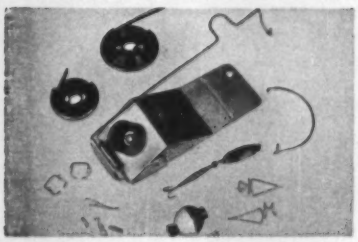
The booming market of hobbies and sports is typical of the far-reaching use of A.S.C. products. Often small but always important, springs make better products possible — and A.S.C. Divisions make better springs through constant research and experiment. Write for "The Picture Book of Springs."



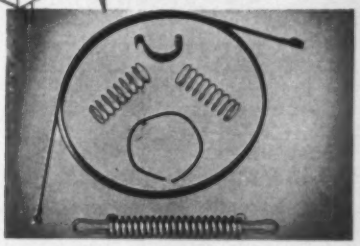
HUNTING — Ammunition clips, trigger springs and gun parts for civilian and military use; even a precision sling shot frame.



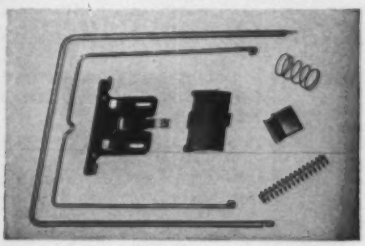
MUSIC — Coils and clips for radio, TV and record players; violin mute springs, guitar levers, springs for cornets, pianos, organs.



FISHING — power springs for reels; wire and flat springs for rod holders, lures; and a frog holder frame.



BOATING — starter springs and parts for outboard motors; shock-absorber spring for trailers; rope tightener spring.



PHOTOGRAPHY — view finder frames, shutter springs and stampings for movie and still cameras.

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- Turn most pullers
- Drive and remove screws, lag bolts
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- Remove carbon, scale, rust, paint
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- Tap threads
- Many other jobs

This SNAP-ON electric impact wrench is one of the handiest tools in the shop. It works so fast and easy your men can turn out double and triple the work without even thinking about it.

There's extra safety, too, in an impact wrench. A man can get up on a ladder or work in awkward positions without fighting the side thrust of a regular electric tool. Also, on drill or other work it won't burn out if the attachment gets stuck.

The tool's one-half inch square drive takes sockets 3/8 to 1-1/16 in. — many accessory tools available. Two models — 115 volts, 220/230 volts. Tool is top quality throughout — has many construction advantages. Get full details from your SNAP-ON representative. Factory branch warehouses in principal industrial centers. Or write us.

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operated through a new subsidiary, Data-Master Corp.

Reliance Instrument Mfg. Corp., Glen Cove, N. Y., has been purchased by **Electro-Mech Corp.**, Norwood, N. J., a wholly owned subsidiary of American Chain & Cable Co. Inc., New York. The Glen Cove firm will be operated as the Reliance Instrument Div. of Electro-Mech. B. C. Webster will be general sales manager.

In reporting the purchase of **National Precision Casting Corp.**, Paoli, Pa., by **General Casting Corp.** (STEEL, July 4, p. 65) an incorrect address was given. General Casting Corp. is located in Peekskill, N. Y.

NEW ADDRESSES

Mathison Magnesium Inc. moved to larger quarters at 431 W. Newhall Ave., Milwaukee, Wis. Officers of the fabricating firm include President, Lyall Mathison; secretary, Elmer Brucks.

A. F. Klinzing Co. Inc. (metal spinning and metal products) moved its general offices to 740 N. Plankinton Ave., Milwaukee 3, Wis.

NEW OFFICES

Kaiser Steel Corp., Oakland, Calif., opened a sales office at 336 Korber Bldg., Albuquerque, N. Mex. The office will be headed by K. W. Meserve.

Vitro Corp. of America, New York, opened a branch facility at 2301 Pontius Ave., Los Angeles 64, Calif. The operation includes electronic marketing, maintenance, and service facilities; product showrooms; and administrative offices.

Computer Div., Philco Corp., Philadelphia, opened an office in the Merchandise Mart, Chicago. C. R. Burk is regional sales manager.

Black & Decker Mfg. Co., Towson, Md., opened a factory service branch at 3811 El Cajon Blvd., San Diego, Calif.

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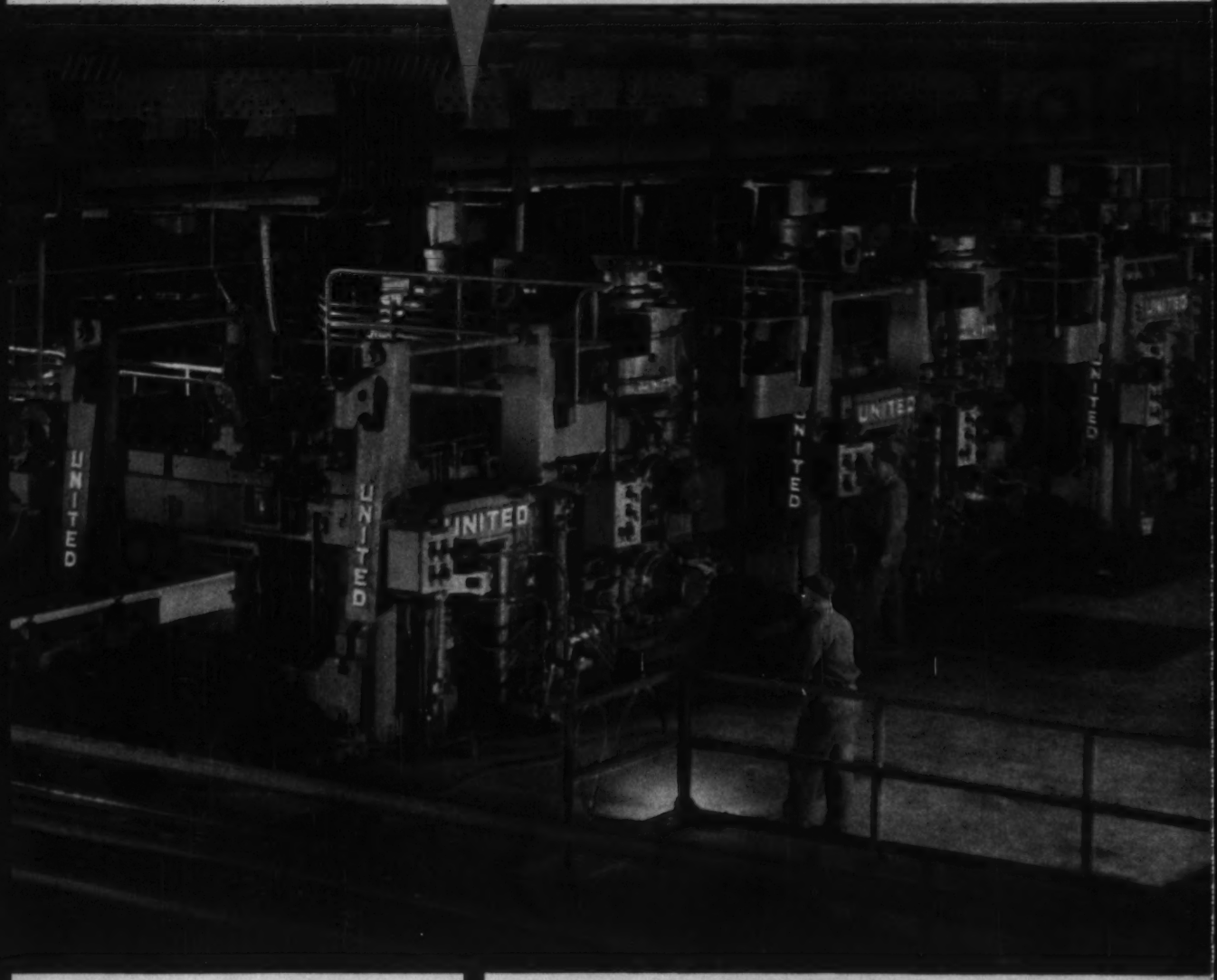
6–Stand continuous horizontal and vertical Billet Mill



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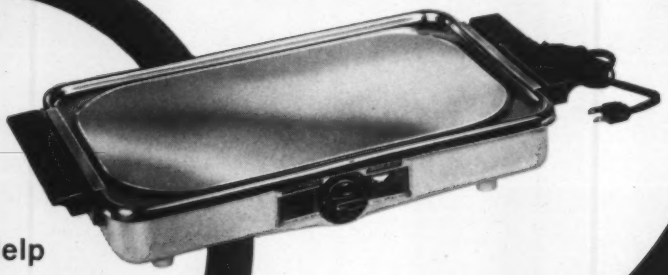
GUIDANCE THAT EARNS ENCORES

Photos, courtesy of the Mfgr., M. H. Graham Corporation, Minneapolis, Minn.

Appliance Manufacturer Finds CSS Metallurgical Help an Essential Ingredient in Producing New Products



First, it was a coffee maker. Then, a tea maker. And now, it's a new type electric grill. In each case, the manufacturer turned to The House of Stainless for metallurgical assistance.

For example, with the "Ranch Grill," tri-ply stainless steel gave the makers the necessary uniform heat transfer, the ease of cleaning, strength and corrosion resistance desired. While this was a relatively simple solution, the real service our metallurgists performed was in adapting the tri-ply from sheet to finished cooking surface.

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Technical Outlook

SEEDED STEEL SPROUTS FINE GRAINS— With a process called "nucleation of steel ingots," U. S. Steel Corp. engineers say they can produce steel of finer grain and better rolling and shaping properties, plus a superior finish. Atoms formed by the seeding of liquid steel result in the formation of the smaller grains as it cools. The fine grains make the steel more plastic for easier rolling and shaping. The process was developed by Dr. Bernard R. Queneau, assistant manager of metallurgy inspection and research, Tennessee Coal & Iron Div., and Dennis J. Carney, in a project at South Works, Chicago.

ATOMIC REACTOR TIPS— The struggle toward lower costs for power generated by atomic reactors will be affected favorably by advances in: 1. The application of ordinary carbon steels in reactor parts. 2. Longer lived fuel elements (current tests on improved burnup rates for uranium carbide are nearly ready—STEEL, July 11, p. 91). 3. Further studies of zirconium vs. stainless. (Although zirconium is more expensive, its better neutron cross section could make it outperform stainless.) So say researchers at Battelle Memorial Institute, Columbus, Ohio.

DEPLETED URANIUM GOES ALOFT— Aircraftmakers have told the Atomic Energy Commission that depleted uranium is an excellent material for use as counterweights in the wing tips and tailpieces of jet commercial planes. The material, with less than the natural concentration of U-235, is available in large quantities from the commission's production facilities. In a typical application, one plane would take 300 lb of the material.

BEATS HYDROGEN COSTS— A new device that breaks out hydrogen from anhydrous ammonia is expected to cut costs of bottled hydrogen by 25 to 30 cents per 100 cu ft, says a Chicago firm.

TITANIUM SUCCESS— A full scale rocket motor casing for the Army's Minuteman has been made entirely of titanium, reports Aerojet-General Corp., Azusa, Calif., a subsidiary of General Tire & Rubber Co. It's heralded as a major breakthrough in solid propellent technology.

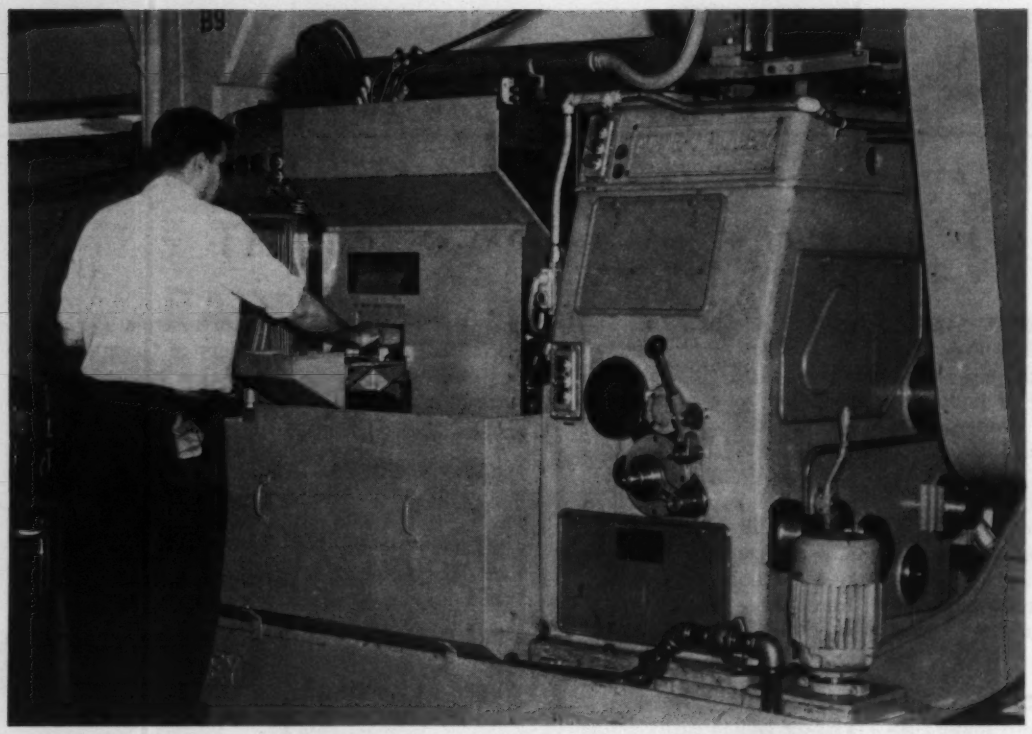
HALVING COSTS— Aluminum anodizing normally runs 5 to 6 cents a square foot. Chevrolet Div.'s Flint, Mich., plant reports it operates its anodizing line for less than 2.5 cents a square foot. Waste chemicals are even used to clean up floor oil and grease in efforts to pare plant operating figures.

CUPOLAS FOR OXYGEN STEEL— Steel foundries might install cupolas to provide a source of molten pig iron for basic-oxygen steelmaking, suggests Union Carbide Metals Co., a division of Union Carbide Corp., New York. The cupola-oxygen furnace combination might be used for: 1. High volume carbon steel casting production. 2. Production of steel, gray iron, and Ductile iron.

WELDABLE STAINLESSES— An old time bugaboo—cracking—has been licked by Westinghouse Electric Corp., Pittsburgh, with a new series of stainless steels called Kromarc. The American Society for Testing Materials was told at its annual meeting in Atlantic City, N. J., that of 18 elements studied, two (titanium and columbium) produced the worst hot cracking effects (tantalum is much better). Manganese, molybdenum, and tungsten are highly beneficial, and vanadium is neutral, said Dr. F. C. Hull, advisory metallurgist.

STAINLESS PROTECTION— In making curtain walls for the 4 Gateway Center Building, Pittsburgh, engineers used waxed paper plus talc to prevent scratching while making right angle bends.

NAILS AT TWICE THE PACE— Engineers at E. W. Bliss Co., Canton, Ohio, have designed a nailmaking machine that will turn out 700 nails a minute—2⅓ times the output of its predecessor. The machine crops the wire to length, then points the end and forms the head in the same station.



A battery of these machines will convert SAE 1141 steel forgings into automotive transmission shafts. Each of the machines has tracer turning attachments in four of the six spindle stations

15 Ways to Get More from Automatics

A MAJOR automotive transmission builder soon will be getting a fourfold increase in output of transmission shafts by using a pair of multiple spindle automatics for tracer turning—a job normally reserved for single spindle machines.

Engineers at National Acme Co., Cleveland, figure the machines will turn out a short shaft every 20 seconds. A long shaft will take 43 seconds.

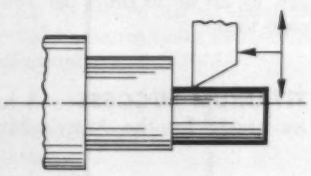
• **Selling the Unconventional**—The engineers say they feel that in addition to tracer turning, nearly any machining operation can be added to a multiple spindle automatic if the conditions are right. "Nearly all the special operations will require either machine modification, or attachments, or both," says Robert Beacom, engineer in charge of special attachments, "but in many cases, the added expense can be quickly written off by the elimination of secondary operations, extra handling, and the need for separate machines to do special jobs."

Suppliers of multiple spindle bar or chucking machines are looking more and more for operations that can be added. The economy that comes with such a combination can be the factor that sells the machine. "On most of the jobs we now bid on, we try to include at least one special modification that would be a better profit maker for the user," Mr. Beacom says.

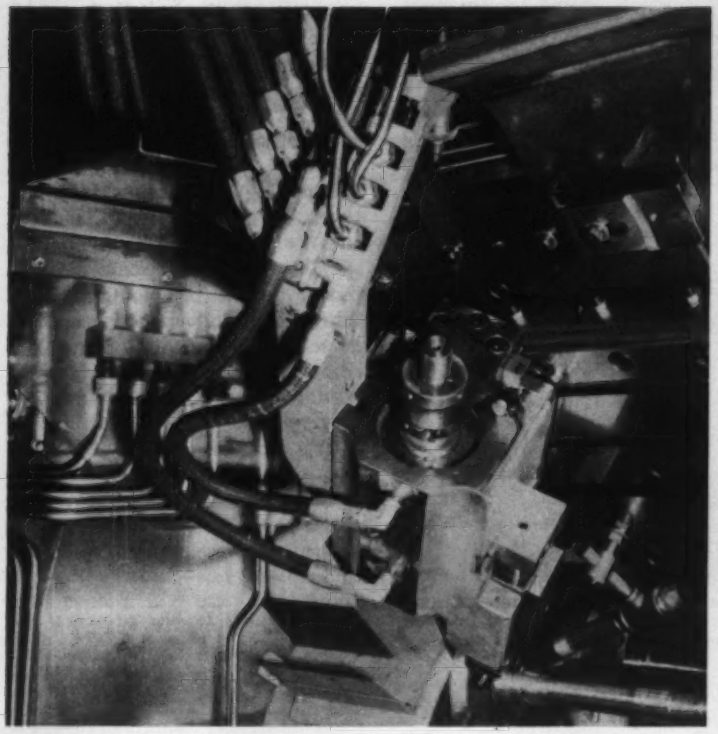
• **Checklist for Ideas**—"Most production men think of the multiple spindle automatics in terms of the conventional operations such as forming, drilling, boring, reaming, turning, and cutting off," Mr. Beacom says.

He suggests 15 added operations that could help increase the productivity of your machines.

Eccentric Turning



Turning a diameter that is off-center with respect to the stock is



The close-up shows a nearly finished shaft (lower right) and the tracer stylus and template (top center)

Putting some relatively unconventional machining jobs on multiple spindle, automatic screw machines can pay off in production efficiency, say the experts

normally done by using a gearbox driven attachment on the end tool slide. The attachment is synchronized with the work spindle, and a conventional turning tool does the cutting.

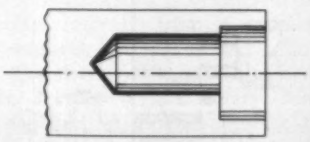
Eccentric Forming

As in eccentric turning, the forming is done with a gearbox driven attachment that's synchronized with the work spindle. The operation is done from the cross slide, however, and either dovetail or circular form tools will work.

Eccentric Recessing

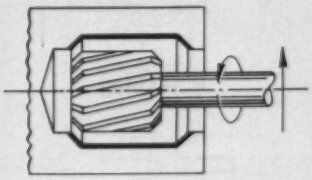
This operation is also done with a synchronized gearbox driven attachment. Recessing is done with either circular or plain recess tools which are mounted on the end tool slide.

Eccentric Drilling



By mounting a synchronized attachment on the end tool slide, a drill or counterbore can be made to drill off-center. The drill does not rotate; it oscillates in a circular path.

Recess Milling

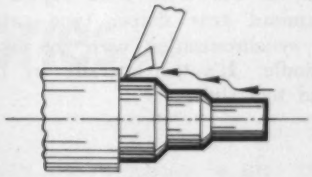


From an attachment mounted on the end tool slide, a rotating milling cutter is fed into the bore, then fed to depth either by the cross slide or by a built-in cam.

Recess Boring

A boring tool (either circular or bar type) is fed into the recess either by the cross slide or a built-in cam. It's fed laterally by the end tool slide. If a contour cam is used, the same procedure will generate a contour recess.

Contour Turning or Boring



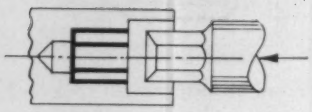
Using either a turning tool for the outside diameter or a conventional boring tool for the inside diameter, a tracer attachment mounted on a cross slide or end tool slide follows a template through a hydraulic tracer valve—reproducing the contour on the part. The tracer hydraulic unit and valve assembly are the only special equipment needed for the operation. (See photograph at top of page.)

Slotting

Either a saw or a milling cutter is fed into the work by an attachment mounted on the end tool slide. The attachment can be synchronized with the spindle, or the spindle can be stopped in the slotting position. The spindle stop requires

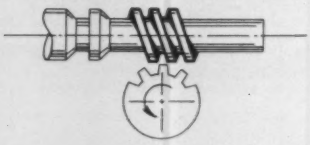
an installation made at the factory in a new machine.

Broaching



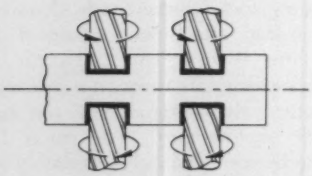
The broaching tool is pushed into the work from a synchronized attachment mounted on the end tool slide. In the drawing, a hexagon hole is broached in a drilled hole.

Worm or Thread Generating



A synchronized attachment mounted on the cross slide rotates a standard gear shaper type cutter in synchronization with the work spindle. It's fed laterally by the end tool slide.

Cross Milling

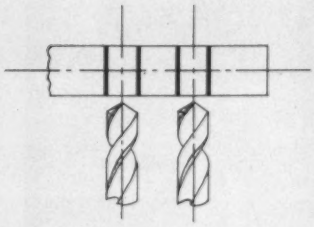


End mills are fed by an attachment on the cross slide. The spindle is stopped by a special carrier installed at the factory.

Spline Hobbing

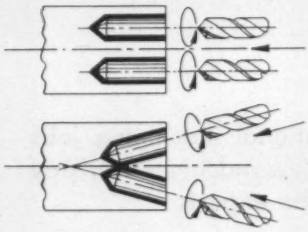
On a machine equipped with a special spindle stopping carrier and brake, an attachment on the cross slide drives a hob that's synchronized with the work spindle through a driving gear which is mounted on each spindle.

Cross Drilling or Tapping



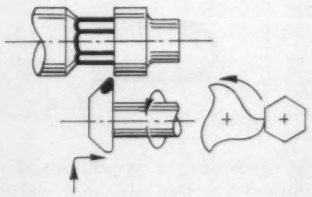
Either drills or taps (or both) can be fed by a cross slide attachment to work on cross holes. In both cases, it will take the factory installed spindle stopping carrier.

Multiple End Drilling



As shown, the drills can be parallel to the stock center line, or at an angle. The tools are fed by an attachment from the end tool slide. The attachment may rotate with the spindle or a spindle stopping mechanism can be used.

Polygon Milling



Milling of any regular polygon (to reasonable tolerance limits) can be done by rotating a cutter (number of flutes equals half the number of flats desired) at twice the work spindle speed. This is done with an attachment on the cross slide, fed laterally, if desired, by the end tool slide.

• **Summing Up**—Those are the types of operations Mr. Beacom cites as profit boosters on multiple spindle automatics. Some of them can be done in combination. Those that take attachments only can often be set up in the user's plant. Machine modifications may have to be done in the builder's plant and may require a new machine.

One word of caution: Mr. Beacom says that in some cases, the extra operation will be the slowest one in the cycle, so it will be the determining factor in production rates.

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in STEEL. For details, see the Servicenter, Pages 5 and 6.

Degassing Cycle Speeded With Automatic Tongs

Bell covers that weigh 74,000 lb are lifted from ingot molds with four legged automatic tongs at Midvale-Heppenstall Co.

The covers are part of a modern vacuum stream degassing system installed in the plant's steel melting department. One of the covers is placed over the mold before steel is poured from the ladle; that permits removal of gases such as hydrogen, oxygen, and nitrogen through a vacuum system. When the ingot is completed, the cover must be taken away, so the ingot can be lifted from its mold.

The tongs, controlled from the crane cab, are manufactured by the Materials Handling Div., Heppenstall Co., New Brighton, Pa. They are designed to fit around a flanged collar in the cover. The tongs are lowered over a cover with the legs latched open. Slack in the line releases the latch; when the tongs are lifted, the legs engage the underside of the collar.

The cover is lifted 40 to 50 ft above the pit floor and held there while the ingot and mold are removed. When the cover is lowered to the floor, the tongs latch open.

Blast Furnace Operation Simulated by Computers

Computer studies indicate possible production increases of 25 to 30 per cent with present blast furnaces and important gains in thermal efficiency and control, says A. L. Hodge, associate manager, gas process development, Linde Co., Newark, N. J., a division of Union Carbide Corp. Use of electronic computers to simulate blast furnace operation in production efficiency studies was described by Mr. Hodge at a general meeting of the American Iron & Steel Institute, New York.

New steelmaking methods and rising production costs make increased production of iron and ferroalloys a must; and investments must be held to a minimum, Linde officials say. Tests made on an operating furnace would be costly and time consuming.

To be sure a new practice will improve operation, steelmen must be able to predict resulting change.

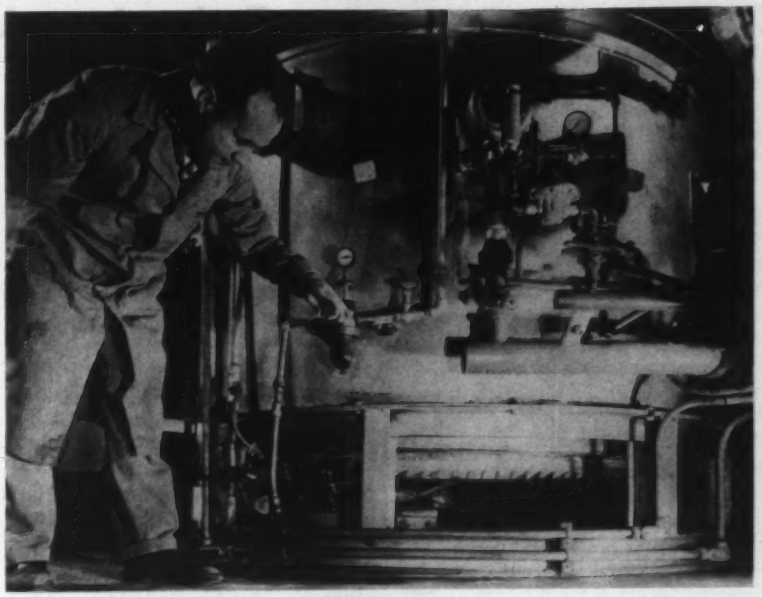
Linde researchers reduced important blast furnace variables to a system of equations that constitute a mathematical model. When a particular stack is studied, each equation in the model is modified with data obtained from that furnace, and the model is programed into a computer.

When a change is made in the mathematical representation of one of the variables, such as air blast oxygen, the computer calculates the effect of the change on other variables and expresses the results mathematically. The method makes it possible to predict what will happen when any operating condition in the blast furnace is altered.

Alloy Guarantee Boosted

Increases in minimum guaranteed tensile and yield strengths for aircraft and missile alloy 7178-T6, in extruded shapes up to ½ in. thick, are announced by Aluminum Company of America, Pittsburgh.

The change, which resulted from Alcoa's product surveillance program, will permit engineers to specify higher strength extruded shapes without paying the penalty of increased weight.



Ratchet ring and pneumatically operated pawl automatically control indexing and time sequence of rotating hearth

Rotating Hearth Tests Refractories

A SEMICIRCULAR furnace with a rotating circular hearth is used to test refractories at the Gaber Research Center of Harbison-Walker Refractories Co., Pittsburgh.

The furnace, built by Kutz Engineering Inc., Pittsburgh, alternately exposes the material to high temperature and atmospheric temperature.

• **Rotation Controlled**—The operation is automatic. The hearth can be rotated about 6 degrees at controlled intervals from 2 seconds to 2 minutes.

The drive component attached to the bottom of the rotary hearth comprises: A ratchet driving ring (75 in. in diameter), which engages a pneumatically operated pawl; a supporting track (52 in. in diameter), resting on three stationary tapered rollers 120 degrees apart.

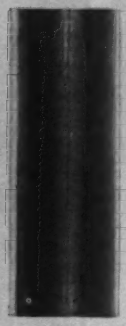
• **How Fabricated**—First consideration was to choose a steel that resists wear and impact loads. Kutz's choice: Jalloy plate, a product of Jones & Laughlin Steel Corp.

The teeth were cut from a 4 in. wide strip of ⅝ in. plate. A series of holes was drilled through the plate in two lines, defining a central band 2 in. wide. The holes located the roots and tips of the ratchet teeth. The plate was then torch cut between the holes, producing matching toothed bars. After roll forming the teeth, the bars were bent into a semicircle and butt-welded to form the ratchet ring.

A 4 in. strip of the same material was used in making the track ring. The strip was cut from end to end in a straight slanting plane through the center line of one face. The two pieces were welded side by side to form one continuous slope 1¼ in. thick to bear on the tapered rollers. Heat treating followed to provide resistance to impact loads.

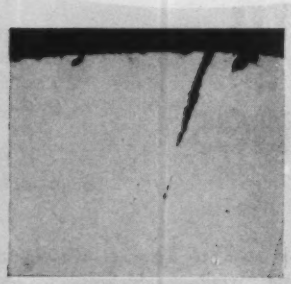
Spinning Head Inspects Total Rod Surface

To find flaws . . .



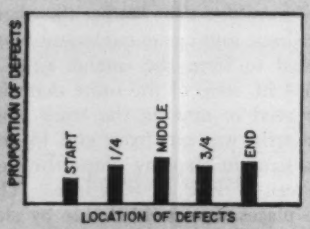
Imperfections such as this cause faulty rollers, rejected bearings. Early detection will eliminate processing unsuitable material

Which can go deep . . .



Photomicrograph shows how surface flaw extends into the steel too far to be removed by grinding

Anywhere in the coil . . .



Location of defects may vary in coils. End inspection helps, but is not conclusive

MORE EFFICIENT material utilization and a reduction in scrap losses have resulted from installation of new inspection equipment at Timken Roller Bearing Co., Canton, Ohio.

R. A. Bloom and G. A. Reifsnyder, of Timken's Metallurgical Dept., state that the method, called Eddy Current Rototesting, continuously inspects the entire surface of cold heading stock and identifies flaws.

Finished bearings are given a 100 per cent inspection. Since installation of the new equipment, not a single defective roller has been found in final inspection. And Messrs. Bloom and Reifsnyder report that millions of rollers have been produced from eddy current inspected stock.

• Previous inspection methods were manual; it was just about limited to sample sections.

The new equipment replaced a visual plus magnetic particle inspection of the steel coil or rod used for cold heading into rollers. Examination of the entire coil or rod was not practical, so inspection necessarily was limited to samples taken from the end of the coil or rod. But by this method, the entire coil might be rejected while only the ends had flaws, wasting valuable steel. Still, a defect in the interior of the coils, might not be found by examination of the ends, would inevitably show up as a defective roller after cold heading. Many inspections of the rollers, as they are being processed, are required to maintain Timken's quality standards; early flaw detection cuts scrap costs.

• In seeking a suitable commercial test, Timken decided that 100 per cent surface inspection should be the goal.

A study was undertaken to evaluate inspection methods. It was decided that the eddy current method might be adapted for the kind of inspection required, and Timken worked with Magnetic Analysis

Rotating head locates defects . . .

Cold heading stock for roller bearings is tested continuously by new equipment at Timken. Rejects for surface defects in steel have been cut to zero

Corp., Long Island City, N. Y., to develop a new technique for the detection of surface defects in coils or rods to be used for cold heading. Magnetic Analysis supplied the equipment.

Eddy current testing is a type of electromagnetic inspection. Test coils on or near the parts being tested induce a current in its surface. The induced currents (eddy currents) explore the surface and subsurface of the coil or rod. The presence of conditions which impede the flow of the eddy currents measured electronically determines the magnitude of the surface defect.

• The secret of the new test device, which is designed to respond to surface discontinuities such as seams, is the continuous rotation of the test coil.

As the stock is being pulled through the test head, rotation results in each test coil following a helical pattern. Thus the spinning probe allows a complete surface inspection of the stock.

A typical installation at Timken places the Eddy Current Rototester on a wire draw bench, checking the steel as it moves between the drawdie and the take-up reel. The presence of a defect is indicated by a visual and audible reject signal. But at the same time, a relay, solenoid valve, and air cylinder are used to move a cutting tool against the wire being drawn. While the surface defect signal persists, the tool cuts a flat of 0.010 to 0.020 in. on the heading stock. The tool is lifted away when satisfactory material again is being produced.

• The flat is used as a clear and permanent means of identifying faulty sections of wire or rods.

After Rototesting, the wire goes to the header where it passes through an air gage orifice before going into the cutoff bushing. The air gage is connected to a pressure switch, which opens a reject gate in the outlet chute of the header machine when flattened wire passes through the gage. Therefore, the equipment automatically checks the stock, and at the same time will reject faulty material.

Importance of being able to check 100 per cent is pointed up by Messrs. Bloom and Reifsnyder, who report that surface defects are randomly distributed throughout the coil. Such defects are extremely limited in number and extent, emphasizing the importance of 100 per cent inspection, rather than spot-checking, if faulty rollers are to be avoided, without waste of stock.

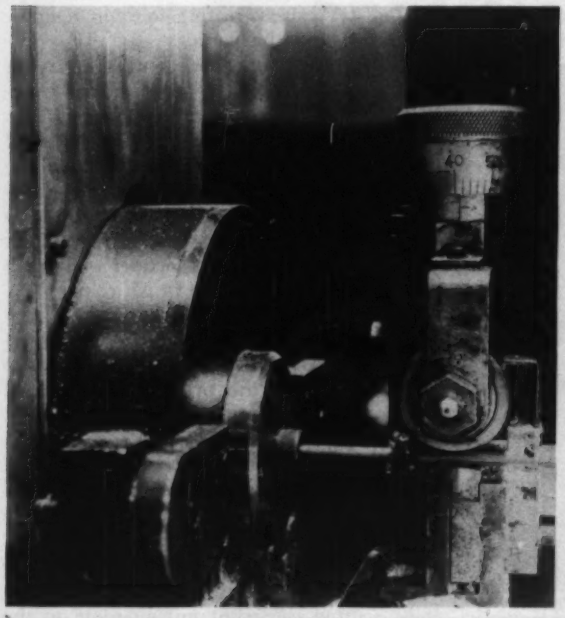
Because rollers are ground, some surface defects can be tolerated, provided they will be removed in the grinding operation. So tolerance limits can be set for depth of seams in the coil or rod which is to be used and controlled by adjustment of the instrument sensitivity. Studies have shown that a table can be set up relating sensitivity to depth of seam. The relationship varies with coil or rod size but a typical series is shown:

Sensitivity	Seam Depth
33	0.003 in.
35	0.0025-0.003 in.
37	0.002-0.0025 in.

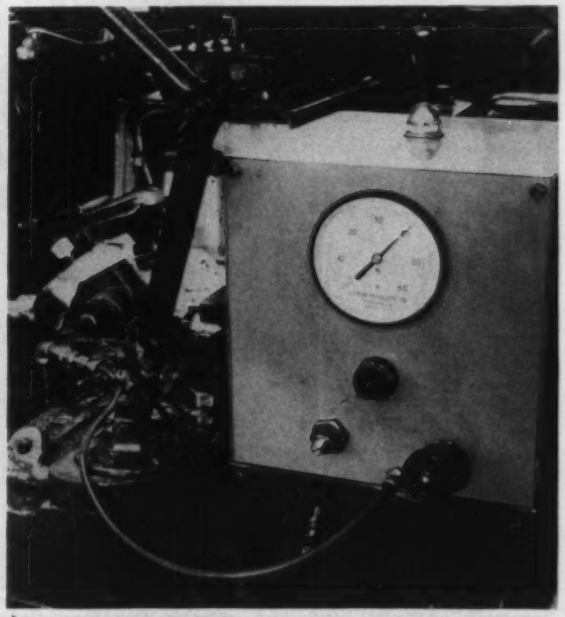
Timken has found that the inspection procedure results in a double benefit.

One is the elimination of further processing of faulty stock.

The other advantage comes about by the use of material which previous tests might have rejected, but is still sound, can be used to make high quality rollers.



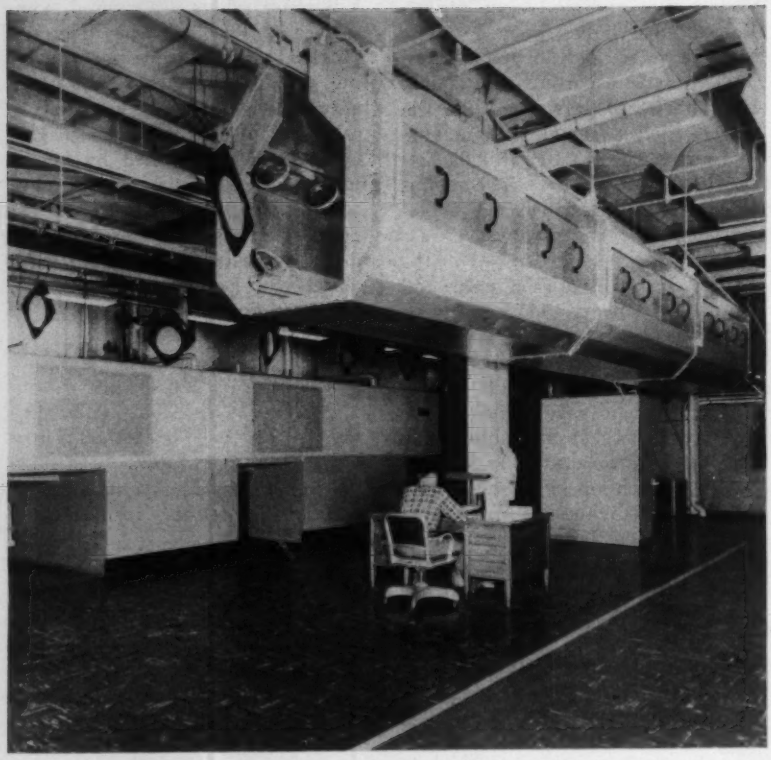
Cutting blade marks them . . .



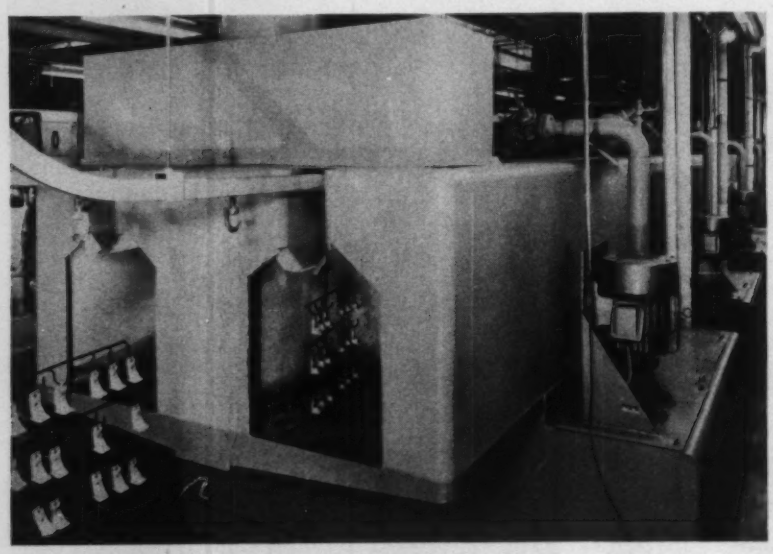
Air gage actuates reject device

Revamped Finishing Setup Neat as Well as Efficient

Clinical type environment for paint finishing is achieved in part by isolating operations



At top, foreground, instrument doors are traveling through 24 ft overhead oven. Suspending the equipment leaves floor space clean and uncluttered



Pneumatic controller parts are entering five-stage cleaning machine. Note absence of water vapor and dust

THE SPIC AND SPAN appearance found in the finishing department of Foxboro Co., Foxboro, Mass., rivals the immaculate housekeeping of a Dutch housewife.

It's dustfree, a condition due in part to the fact that the finishing facilities have been set apart from other manufacturing operations. Also, it's free of water vapor, a problem in some departments.

In planning its spacious new department that has doubled production, the company had two objectives: Produce quality finishes; improve working conditions.

The new five-stage metal cleaning machine, designed and built by the Industrial Equipment Div. of R. C. Mahon Co., Detroit, embodies a high degree of automation. A twin conveyor type, the 10 ft wide by 62 ft long machine permits two lines of work to be treated at the same time. Work flows at the rate of 8 ft per minute.

In sequence, the work is subjected to a 45 second alkali spray cleaning at 165° F; a 30 second hot water rinse to wash off the alkali; a 90 second treating spray at 110° F to etch and treat the metal; a 30 second cold water rinse; and a chromic acid rinse at 110° F to neutralize any excess treating solution remaining on the parts.

The work then enters a drying oven (one of four) fastened overhead to keep floor space clear. This oven operates at a temperature of 350° F, and completely dries the part after it leaves the cleaning machine. Similar overhead units are used for force drying of the primer and first coat of lacquer and for a final bake of the finish coat.

The ovens are constructed of aluminum sheets over angle-iron reinforced frames. Because they are so light, the ovens are suspended directly from the conveyor belt.

About 20,000 various painted parts are processed, and all of them pass through the separately housed finished system. At any one time six of the more than 150 colors used in the finishing of instruments are circulated through color coded lines from the paint mixing room to the spray booths.

VULCANITE CENTERLESS WORK AND REGULATING WHEELS

PRECISION MATES!

Centerless grinding is the highest in the art of metal finishing. Unless the work wheel and the regulating wheel have been made for each other, a *needless* handicap occurs. U.S. Rubber centerless wheels are precision-mated. The production of perfect mates for centerless grinding is a U.S. Rubber specialty.

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Mechanical Goods Division

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WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

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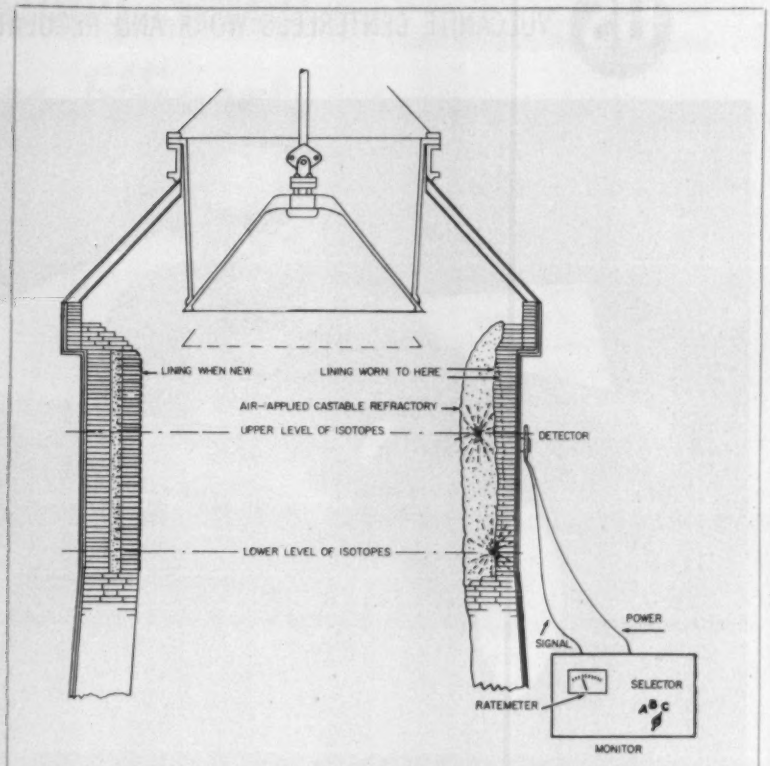
Cobalt 90 needles taken from a lead container and placed in a ball of castable refractory material . . .

. . . Are inserted in holes drilled through the outer shell of the blast furnace



Radiation sources on the upper level are monitored continuously; three other isotopes are checked weekly with a portable meter

Isotopes Permit Continuous Blast Furnace Wear Check

Interruption of signals from cobalt 90, placed in the lining when repairs were made with castable refractory material, indicates loss of a wall section

RADIOACTIVE COBALT permits continuous measurement of lining wear in the throat area of "F" blast furnace at the Pueblo, Colo., plant of Colorado Fuel & Iron Corp.

Tracerlab Inc., Richmond, Calif., helped CF&I prepare an application to the Atomic Energy Commission for a license, supplied equipment, and supervised installation of the radioactive material.

• The company decided to put tracers in a castable lining; cobalt 60 got the nod because it is easy to handle, effective, and reasonably priced.

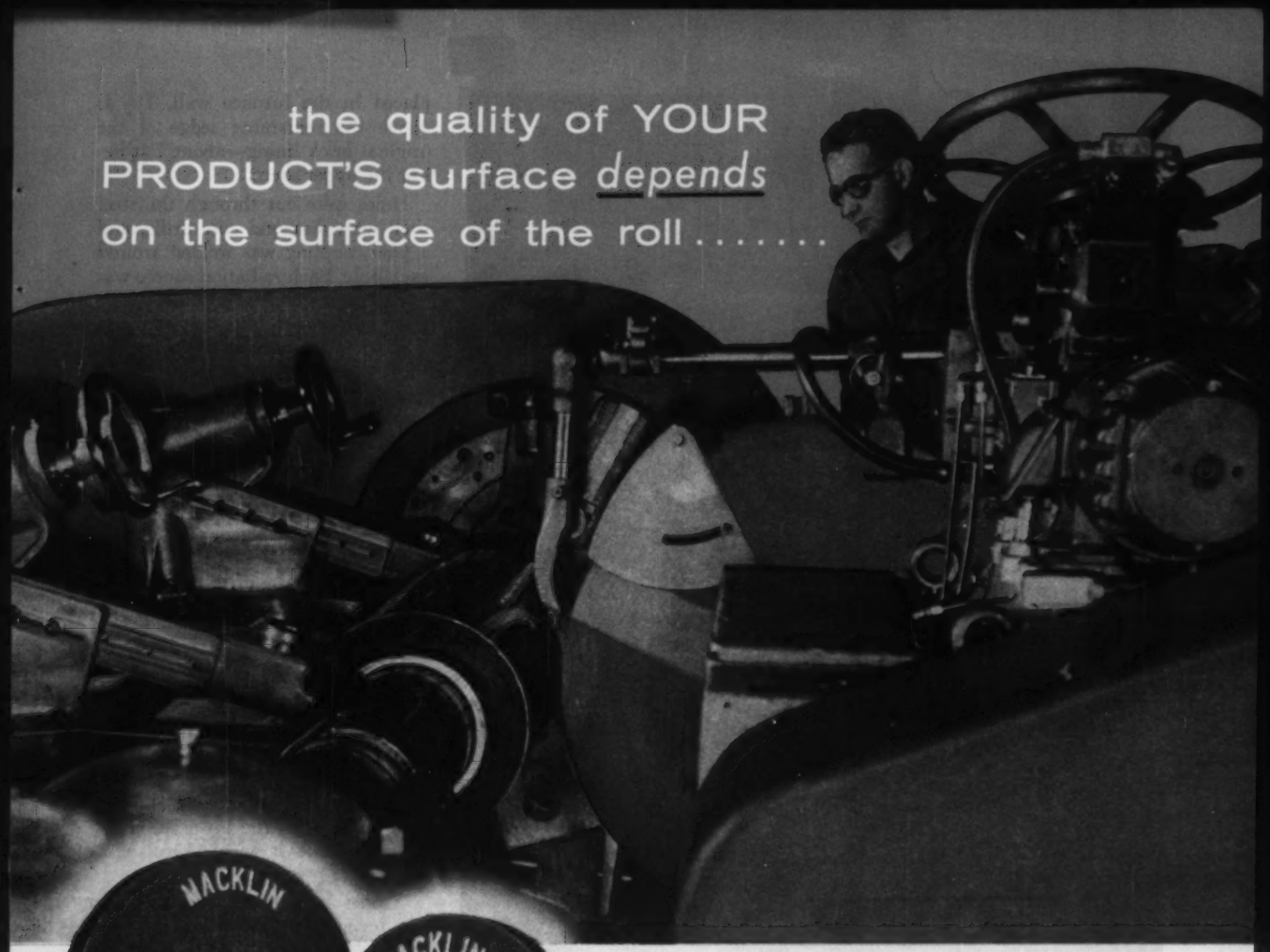
The upper section of the furnace was being relined in late 1959 with a pneumatically applied, castable refractory. It was decided to place radiation sources inside the refractory material, and check them periodically from the outside of the stack with a Geiger counter, to see how well the patched area was withstanding erosion. A sudden drop in radiation would tell operating personnel when one or more of the sources came loose and went down in the stack with the burden.

Cobalt 60 produces enough radiation to penetrate the furnace walls. Its half life of 5.3 years is suited to the normal lining life. (Material with a shorter half life would require higher radiation energy when it was installed; longer half life might cause material to be radioactive after it had served its purpose.)

Personnel working within 10 ft of unshielded isotopes wore film badges which were sent to Tracerlab for checking. Almost no dosage accumulation was reported.

• Radiation sources were buried in castable material in areas of extreme erosion.

Two cobalt 60 needles were placed



photograph courtesy Landis Tool Co.

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For practical answers to your roll grinding problems depend on custom-engineered Macklin roll grinding wheels. Their controlled porosity and sharp grains give you top production and a surface free of traverse lines and scratches. They cut fast. Provide good finish without chatter . . . and are available in a complete range of grades and sizes.

You'll find it pays to consult your Macklin abrasive engineer. Regardless of the grinding problem, when you make him a part of your product team you can expect results like the performance records at the left.

HERE'S PROOF OF PERFORMANCE . . .

HOT MILL WORK ROLLS
(Chilled Iron)

Roll size—25½" x 66" long

Comment—"Since this is a new plant and operators are limited in experience, this wheel has increased their production and produced a good finish of 15 to 20 Micro Inch. All operators are pleased with this wheel. It grinds 100 rolls in 95 hours."

36" x 4" x 20"—GC361 J15 B1268

COLD MILL TEMPER MILL ROLLS
(Forged Steel)

Roll Size—20½" x 48" long.

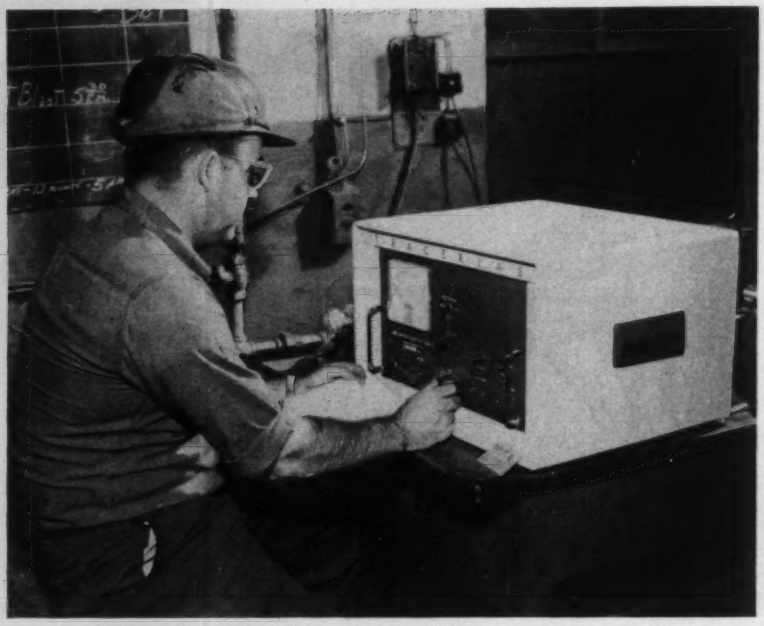
Comment—"Macklin wheel ground 265 rolls and removed 2.109" of stock. Competitive wheel ground 156 rolls and removed 1.297" of stock. The Macklin wheel gave 62% more production than previous wheel used."

30" x 5½" x 12"—A70 L11 B2

Get the complete story. Write for Roll Grinding Bulletin RG60 today.

GRINDING WHEELS

MACKLIN company Dept. 45, Jackson, Michigan



Meter in monitoring equipment indicates the average number of impulses per minute received from radiation detectors mounted on the furnace shell

Radiation detector, mounted on the outside of the furnace near one of the upper level cobalt 90 sources, is checked for accuracy with portable equipment

in three locations, 5 ft below the opened large bell, where charge materials strike as they fall into the stack.

Castable material was sprayed on the walls in horizontal layers. A hole was made in the material for each isotope deposit, the needles were dropped in with forceps, and covered with castable refractory. The shelf was then built up to a height of 12 in. or more above the radiation sources.

• Lower level sources were inserted in holes drilled through the outer shell of the stack.

Three isotope tracers were also placed in the furnace wall, 1½ ft above the remaining ledge of the original brick lining—about 7 ft below the upper sources.

Holes were cut through the steel shell with diamond core drills, and a pipe coupling was welded around each hole. Each radiation source was buried in a small ball of the refractory and shoved into the coupling. Then pipe plugs were screwed into the couplings to seal the shell.

• Detection and monitoring equipment checks radiation from the sources on the upper level.

A Geiger-Mueller tube in a stainless steel cover is mounted outside the furnace shell near each upper level radiation source. Signal and power lines connect the detectors to a three channel monitor in the foreman's office on the casting floor. A rate meter in the monitor indicates the average number of radiation counts per minute passing through the detectors.

Rate meter readings of each detector are taken before each cast, and sources on the lower level are checked at least once a week with a portable meter.

Upper level sources are closer to the furnace working face than those on the lower level, and will probably be lost first. When one of the isotopes is lost, its detector will be placed near one of the lower level sources.

• Loss of radiation sources in the furnace will not seriously contaminate the iron, company officials say.

When any isotopes are lost from the furnace wall, the foreman will alert trained CF&I personnel, who will follow the radioactivity of the pig iron—if detectable—through the open hearth and rolling mills.

The cobalt 60 will melt and disperse in the molten iron. But slag and flue dust will be checked for radioactivity, which will be diluted in at least three open hearth heats. That will render the steel lower in activity than the maximum allowed for drinking water.

Sources still in place when the furnace is shut down for relining will be recovered and used elsewhere, or disposed of in a manner acceptable to the Atomic Energy Commission.

435′ OF CONTINUOUS HEAT TREATING UNDER "PUSHBUTTON" CONTROL-

DREVER

ROLLER HEARTH LINE FOR TREATING BAR AND PLATE

The Drever Roller Hearth Line provides the higher output to be expected from continuous production but at the same time adds ease of operation, versatility, and uniformity of quality. Engineered as a complete coordinated unit, it hardens, quenches and tempers twelve 6" dia. x 40′ long bars at a time with maximum production rate of 30,000#/hr. It can also be used to normalize carbon steel plate up to 72" wide x 40′ long at a rate of 19,000#/hr.—or heat alloy steel plate to 1650°F with controlled cooling to 1300°F at a maximum rate of 9,500#/hr.

The entire operation from charge to discharge is directed from an air conditioned booth which utilizes television monitoring and radio intercommunication from booth to floor.

The rolls of each unit have separate drives—maximum line speed is 200 fpm, variable to a low of 0.3 fpm in the tempering furnace.

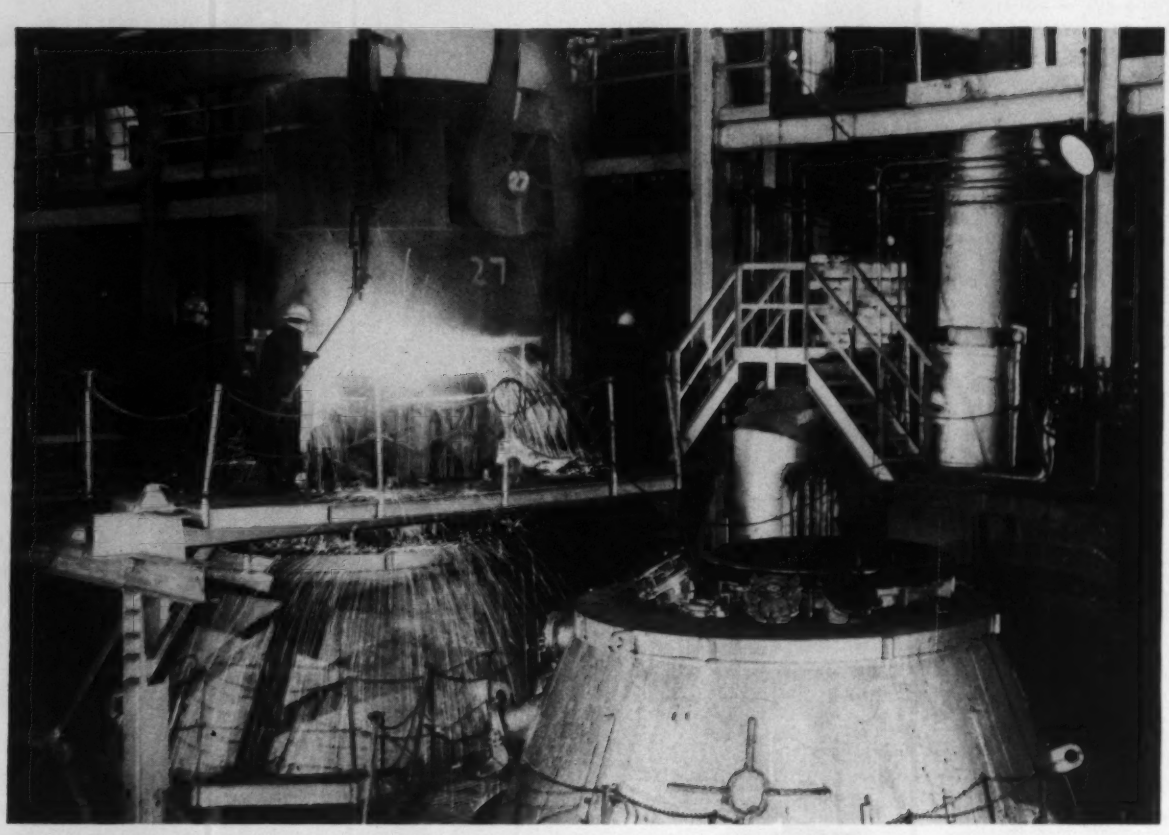
Like all Drever Heat Treating Units, the Roller Hearth Lines are engineered to be an important part of the modernization of metals production processes—and are the result of specialization since 1939. Write or phone us about your heat treating requirements.

DREVER COMPANY

BETHAYRES, PA.

Phone: Wilson 7-3400

Rollmaker Adopts Vacuum Degassing



Molten electric furnace steel pours into a vacuum chamber like that in the foreground. Bethlehem says tests show that rolls forged from vacuum cast ingots are markedly superior to air cast

THE entire line of hardened steel rolls produced by Bethlehem Steel Co., Bethlehem, Pa., will be made from vacuum cast ingots. Formerly, they were forged from air cast ingots. No price increase is involved, the company says.

The big advantage of the new rolls is that the hydrogen content is reduced throughout the ingot cross section.

The reduction of hydrogen eliminates flaking or microcracks and minimizes embrittlement tendencies in the large forgings, the company claims.

Bethlehem has already shipped several hundred large rolls made from vacuum cast ingots to plants working both ferrous and nonferrous metals. Performance records, the company says, show the new rolls to be superior to their air cast predecessors.

• **How It Works**—Bethlehem got into the vacuum casting business in 1956 to produce higher quality steel for heavy forgings. At about the same time, the production men started to turn out rolls, primarily for their own mill operations.

In the process, steel melted in the electric furnace is poured either into a pony ladle at the top of the vacuum pouring unit and then into an ingot mold, or from the furnace ladle into a second ladle contained in the vacuum tank.

Steel flows from the pony ladle (or the furnace ladle) through a high vacuum degassing chamber. Actually, the flow is a spray, in contrast to the tight, ropelike stream of the air cast ingot. The disintegration of the hot metal into small droplets releases the hydrogen as well as other gases.

• **Results**—Tests that compare the metal in the furnace ladle with the degassed metal show a hydrogen removal of about 63 per cent. A typical analysis of gas samples taken from the vacuum line: Hydrogen, 31 per cent; nitrogen, 36 per cent; carbon monoxide, 29 per cent; carbon dioxide and oxygen, 4 per cent.

All forgings are ultrasonically tested throughout processing and before final machine finishing and polishing to find any discontinuity within the rolls. Hardness tests and final surface finishing assure that rolls meet specifications.

New Missile Steel Offered to Industry

MX-2, an ultrahigh strength steel originally developed for missile motor cases, is now available for general industrial use. Many new applications are expected to be found in the aircraft, automotive, construction, and oil industries.

The material is said to have two to three times the strength of normal construction steels. (In tests, it has withstood 280,000 psi burst pressure), and it can be readily fabricated by rolling, forming, deep drawing, welding, and machining.

• **Suppliers**—The steel is being produced by United States Steel Corp., Latrobe Steel Co., Allegheny Ludlum Steel Corp., and Universal-Cyclops Steel Corp., under tentative agreements with Scaife Co., Pittsburgh, a subsidiary of Wilson Bros.

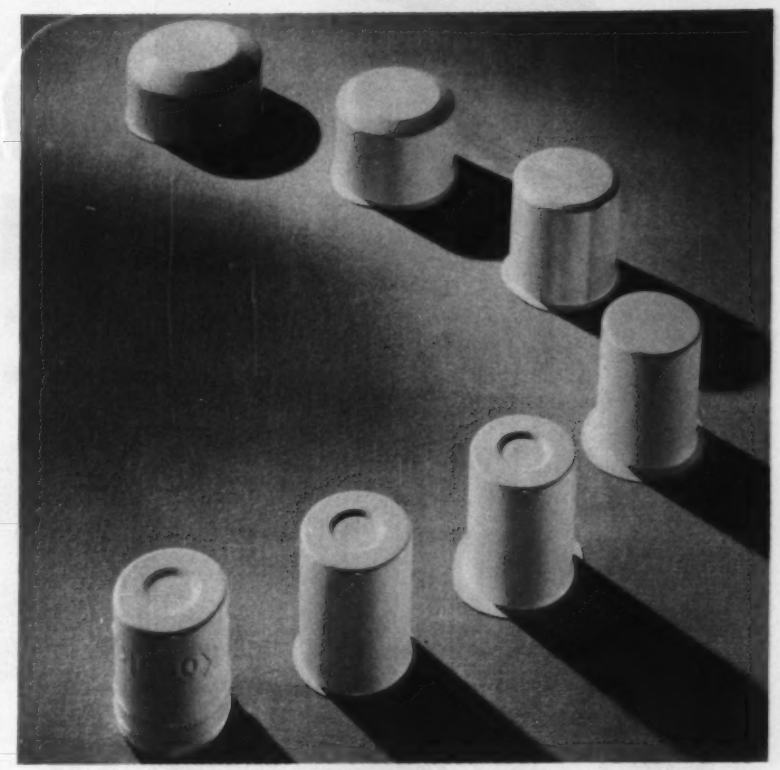
Scaife is in the process of setting up a licensing program. (It is not a steel melter.) It has filed patent applications in the U. S. and foreign countries, says Maurice Parker, chairman of Wilson. He estimates that royalties may range from 3 to 10 per cent. Scaife has been using the material to make motor cases for missiles.

• **Composition**—The material is described as a cobalt modified, low alloy, high strength steel. Here's one of its nominal compositions at the lower end of the cobalt range: Carbon, 0.39 per cent; manganese, 0.70; silicon, 1.00; chromium, 1.10; molybdenum, 0.25; vanadium, 0.15; and cobalt, 1.00.

• **Market Potential**—Mr. Parker says more than $750,000 worth of the alloy has been produced for prototype use. "We believe that the potential in the steel industry will be in excess of $100 million annually."

Have you Entered the $1000 Contest?

See Pages 5 and 6.



Seven stages for forming 35 mm film container indicate drawability of coating

Kodak Forms Film Can From Precoated Strip

DEEP DRAWING 35 mm film cans from precoated steel brought substantial savings to Eastman Kodak Co., Rochester, N. Y.

Film cans formerly were made of 0.015 in. aluminum. They were drawn, threaded, degreased, enameled, and baked. Only the covers were made of precoated stock.

• Company engineers obtained 0.008 in. commercial black plate with a vinyl enamel coating from Enamelstrip Corp., a subsidiary of National Steel Corp., Allentown, Pa.

A film can is formed automatically in seven steps on a Bliss double crank, gap frame press (1025) at Kodak Park's Sundries Mfg. Div. Stock comes to the machine in rolls 3½ in. wide.

First operation is blank and first draw. The can is redrawn three times, the bottom embossed, and the can sized. A sixth die trims the flange. All work takes place in a lubricating spray of Stoddard solvent.

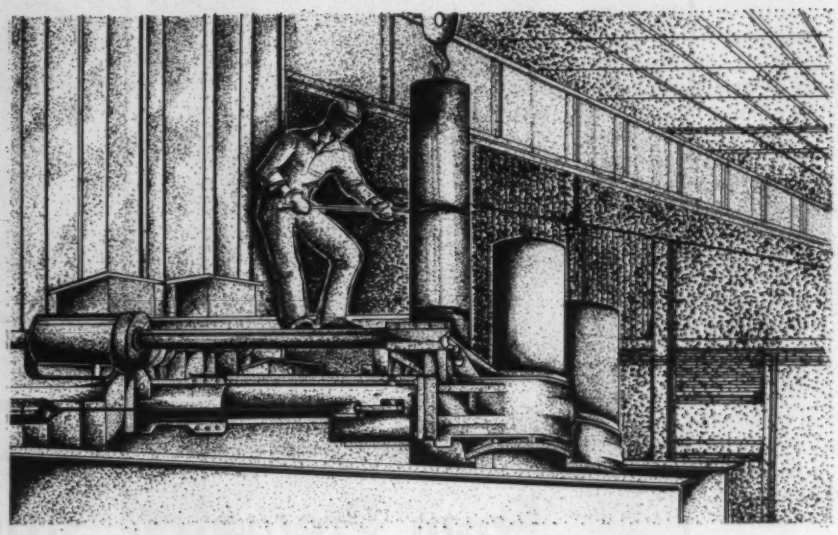
The can then goes to a threading machine which hems, embosses the tradename, threads, and beads in a single operation. After waxing, the can travels to inspection.

Workability of the material has been remarkably good, says Kodak's Tool & Die Dept. The coating helps the drawing operations. Tearing of the 0.008 in. steel is prevented by beveled punches and correct draw pressures.

• Prepainted strip and stock is becoming available in more and more warehouses. It offers potential buyers many cost cutting possibilities.

Such material is simply cut and formed—no other finishing is required.

ELECTRIC STEEL MAKERS CAN DEPEND UPON PROMPT GLC SERVICE



GLC electrode service technicians make it the rule rather than the exception to respond to a service call within 24 hours.

Whenever a customer experiences an undue rise in electrode consumption, every resource of the GLC Electrode Division is at his command.

GLC customer service technicians have had broad experience in melt shop practice and problems. Their record of prompt, effective service to electric furnace operators everywhere is striking evidence of their dedication to the customer's welfare.

We invite you to call upon the time and talents of these men whenever the need arises.

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GREAT LAKES CARBON CORPORATION

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Space Engine Choice Depends on Mission

Three propulsion systems hold most promise, Aerojet-General president asserts

"NUCLEAR rockets will more than double the present performance of chemical rockets. But even that can be further increased if we can find some way of making reactor materials stand higher temperatures."

That's what Dan A. Kimball, president, Aerojet-General Corp., Azusa, Calif., told aviation-space writers in Washington. He believes improved material strengths must be one of our major efforts.

• Exceptionally light nuclear powerplants will be used to supply electricity for the first space engines, later for initial boosters too. Chemical rockets will probably power initial stages of the first space flights.

Three propulsion systems hold the most promise for space missions, says Mr. Kimball: 1. Thermal-arc jet, charged colloid, and the ion.

Which one is chosen will depend entirely on the mission. Thermal-arc jets will be used for short missions; the colloidal for intermediate range; and the ion for long time flights.

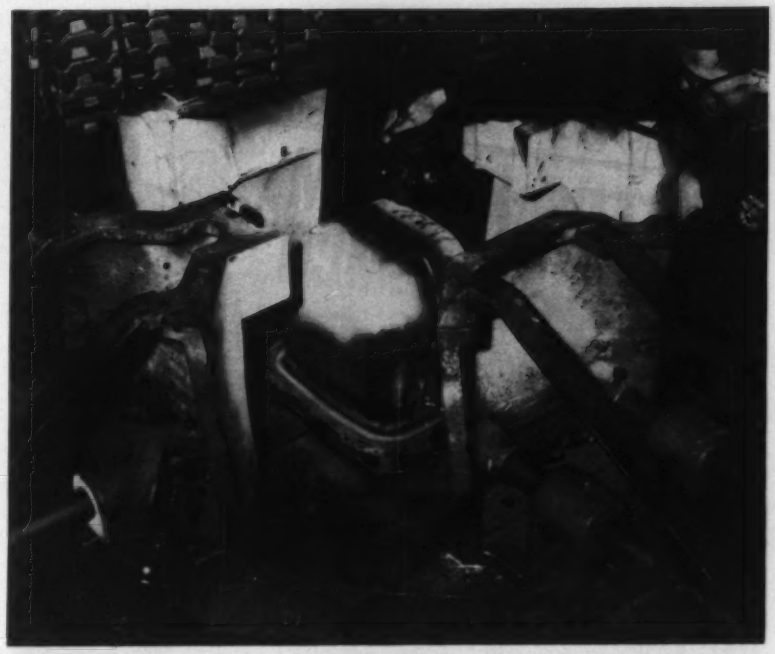
The reactor will supply heat energy for each of the three systems. It will have a working fluid which is vaporized to drive a turbine generator to supply electricity for the propulsion systems and the various needs of the space crew.

The thermal-arc jet requires 100 volts at several thousand amperes to give it a specific impulse of 1200 seconds with a thrust of 10 lb.

A charged colloid system needs 1 million volts but a mere fraction of an ampere of current. Specific impulse is around 3000 seconds; thrust runs from 2 to 5 lb.

An ion electrical propulsion system takes 2000 volts and tens of amperes to get a specific impulse of 5000 to 30,000 seconds with a thrust of 1 lb.

Such thrusts are in marked contrast to an ICBM's 300,000 lb, but since outer space is a frictionless vacuum, acceleration requires only a few pounds of thrust.



A complex permanent mold, used in casting a high pressure gas meter housing, is sprayed with a dispersion of colloidal graphite in water

Wash Cuts Foundry Rejects

Plagued with misruns jeopardizing its production, company turning out gas meter housings finds a releasing agent that facilitates casting of complex parts

SPRAYING PERMANENT molds with the proper releasing agent is whittling casting failures at Oswego Castings Corp., Oswego, N. Y., a division of Oberdorfer Foundries Inc.

The more complex the mold, particularly one with a sliding member or collapsible core, the more care is required to avoid cracking the casting when extracting it.

The part in this instance is a 26 lb gas meter housing, cast in 356 aluminum alloy. It's shaped like a large bucket with an integral rib dividing it down the center. The corners and the bottom edges are rounded. Walls are ¼ in. thick at the top, rimmed with a ⅝ in. flange. Close tolerances must be maintained so that a cover may be installed in final assembly.

• Production in Jeopardy — The problem was one of metal flow and release. Misruns were frequent: The rib broke off during extraction. Clearing the aluminum from the rib aperture in the mold took as long as 3 to 4 hours, reports Frank Fox, production foreman. A number of mold washes employed proved inadequate.

Then one was found that passed the test: Aquadag, a product of Acheson Colloids Co., Port Huron, Mich., a division of Acheson Industries Inc. That wash, a dispersion of colloidal graphite diluted 1 to 3 with water, is applied to the mold with a commercial spray apparatus. A single coating is good for a run of eight to ten pieces, claims the company. The mold is preheated to 700° F and kept at that temperature by the casting cycle. Metal is poured at 1400° F.

The spray facilitates metal flow and parting. Result: Mold life is extended and misruns reduced.

Reservation Review
VOTERS ACCLAIM KEOKUK—KEMCO
KEOKUK, IOWA . . . Galloping Poll shows Chief Keokuk the coast-to-coast choice.
Says Mr. Galloping, "It looks like Campaign Managers Princess Wenatchee and Junior have a sure winner in Chief Keokuk who heads the Kemco Silvery ticket. Foundrymen and steel men know the Chief and they know that Kemco Silvery is the superior form of silicon introduction. When they vote, they'll vote for Chief Keokuk."
CANDIDATE KEOKUK

KEMCO SILVERY PIG IRON

SILICON METAL—OTHER FERROALLOYS

Kemco Silvery is easy to handle by magnet or count and it holds silicon loss to a minimum. Your choice of 60 lb. or 30 lb. pigs or 12½ lb. piglets in regular or alloy analysis for iron and steel production. Send for your copy of the free booklet, "For Lower Costs, Higher Quality Products." Also check the performance of Kemco Silicon Metal in aluminum!

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Division of Vanadium Corporation of America

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Sales Agent: Miller and Company

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3504 Carew Tower, Cincinnati 2, Ohio
8230 Forsyth Blvd., St. Louis 24, Missouri

Cost of Furnace Parts Cut by Material Switch

Substitution of continuously galvanized steel for painted, cold rolled strip cut production costs about 30 per cent on two home furnace components, says Fraser-Johnson Co., San Francisco.

Several of the galvanized steel parts—gas burner venturi covers and draft shield diverters—are used in each furnace. The zinc coated material requires no painting or other treatment. Previously, the parts had to be degreased after fabrication, to remove machine oil.

Because of the strong bond between the zinc coating and the base metal, the material can be fabricated with the equipment used for cold rolled steel. The company found that the material could be sheared, stamped, formed, or punched without flaking or powdering of the coating. And the zinc serves as a die lubricant; no supplementary grease or oil is needed.

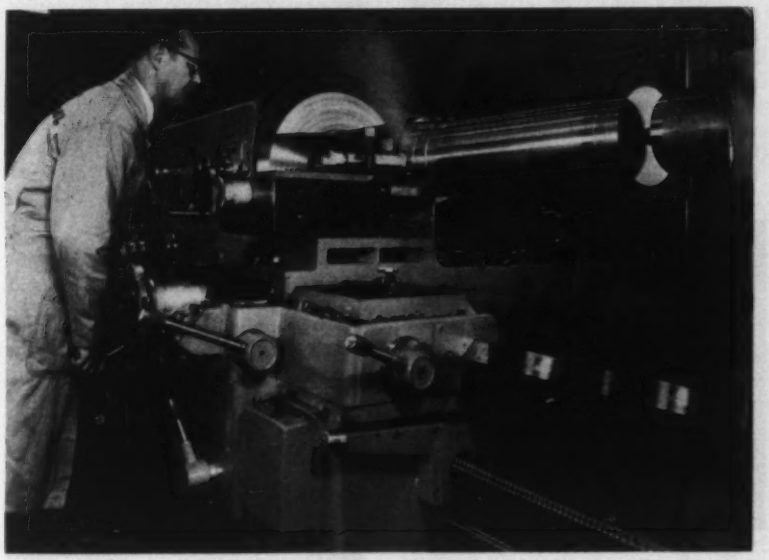
Venturi covers are made in a progressive die, in four continuous steps. The draft diverter is made in a two step die.

Semisilica Refractory Is Announced by Porter

Semisilica refractory bricks for continuous service at operating temperatures up to 2600° F in metallurgical and ceramic furnaces are being produced by the Refractories Div., H. K. Porter Company Inc., at the division's Canon City (Colo.) plant. Called Sem-Sil—they contain about 75 per cent silica—the bricks are made by the dry press method.

The bricks are said to offer unusual volume stability and load bearing ability at high temperatures, and excellent resistance to spalling. In the presence of alkali vapors, a protective glaze forms on the hot brick face, preventing penetration by furnace gases. Principal applications: In roofs of hot metal mixers, roofs and sidewalls of heating furnaces, sidewalls of open hearth regenerators, blast furnace stove domes and sidewalls, soaking pit sidewalls and roofs, and in the lining of ceramic tunnel and periodic kilns.

Lathe Can Handle Stock Up to 504 in. Long



IN DESIGNING this lathe (Model 4025), provision was made for working levers at a convenient height. The unit has 75 hp in all speed ranges, can take stock up to 504 in. in length.

The headstock has 36 spindle speeds in geometric progression with an over-all speed ratio of 160 to 1. All final drives to the spindle are through opposed helical gears and cutting speeds are selected through a single dial control.

Revolutions per minute or surface speed can be dialed on the headstock shifting system. Surface speed selection enables the operator to dial work diameter instead of rpm. Speedup gearing is not used.

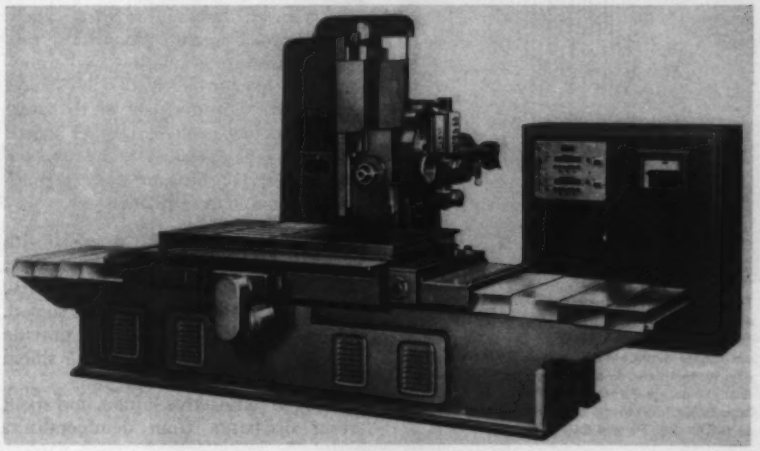
Constant cutting speed can be maintained when a dc motor drive is employed. The lathe is set up to operate at 5 to 800 rpm. It can obtain a 22 to 26 microinch finish. (A 12 microinch finish has been recorded on various test billets.)

End gearing is totally enclosed in a cast housing and is automatically lubricated. All gears are hardened and shaved. The end gearing can be converted from conventional to metric leads. Gears for metric and special leads are available. The gearbox provides 60 threads and feeds. The gearbox direct reading feed and thread plate provides ready visual access to setting data together with dial and lever controls.

The carriage has a variable rate, four way power, rapid traverse. In feed, the carriage is protected against jamming by safety devices such as the electric clutch and pressure release mechanisms. The unit is one of three new lathes, available in eight models.

For further information, *write* Sidney Machine Tool Co., Sidney, Ohio.

Machine Does Precision Boring, Milling, Drilling



THE SERIES H Jigmils have direct dial dimensioning systems (Diatrol) and numerical tape control systems (Tapac). You can get spindle sizes from 3 to 5 in.

Simplified controls and thermal control of the main spindle bearings are featured. Stainless steel bedway covers provide protection from chips and dirt.

You can program such machine functions as spindle speed selection, spindle feeds, spindle depth of feed, automatic spindle rapid traverse, feed and retraction, and automatic advance to new hole locations.

Many automatic machine movements are functions of the electrical

ANACONDA CONDENSER AND HEAT EXCHANGER CLINIC

"Cupralum," lead-surfaced Anaconda copper tube, offers practical answers to some tough corrosion problems

If you'd be interested in more compact, more economical heat transfer units for handling corrosive liquors – sulfuric, chromic, phosphoric acids, sulfites, sulfates, alum, and the like – you should know about Cupralum*. Cupralum, a product of Knapp Mills, Inc., is Anaconda copper or copper-alloy tube to which a uniform, dense-structured, extruded chemical lead surfacing has been metallurgically bonded.

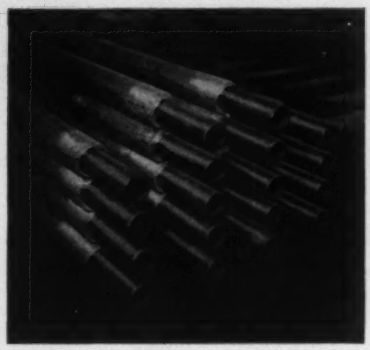
Alfred P. Knapp, chairman, Knapp Mills, Inc., explains to visitors how his company's patented drawing process metallurgically bonds lead surfacing to copper tube.

THE OUTSIDE lead surface, which may be from ⅛" to ½" thick, resists concentrations of acids—of sulfuric acid, for example, up to about 85% and up to 428 F. Being bonded to the copper, it expands and contracts with the copper during temperature cycling. Without the metallurgical bond, the lead would creep and eventually fail—an inherent weakness of all-lead tubing.

THE COPPER or copper-alloy tube inside provides strength to make Cupralum self-supporting – and to stand steam pressures up to 150 psi in standard wall thicknesses offered. It also provides its high corrosion resistance internally to cooling waters, steam, and refrigerants.

Most important, copper offers its high heat transfer rate. Because of the metallurgical bond with the lead, the over-all heat transfer rate of Cupralum is high—higher than all-lead tube and higher than that of iron and steel.

THE NET RESULT is that a given heat transfer job can be done with fewer square feet of surface – for a more compact unit. Or it is possible to get increased capacity in present existing space.



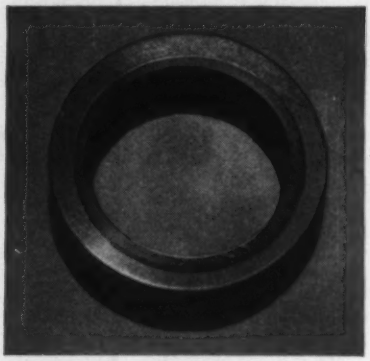
Lead surfacing removed from ends of Cupralum tubes preparatory to insertion in lead-clad steel tube sheet. Tube ends are usually rolled, but for severe thermal cycling service, may be brazed to outer steel face of tube sheet.

Two U-bend Cupralum tube bundles like this are used in a Ferrolum (lead-surfaced steel) separator tower to boil off ammonia from a urea carbonate ammonia solution—in the production of urea fertilizer. Anaconda copper tube core 1" O.D., 12 gauge, handles 150-lb. steam. Lead surface is ¾" inch thick. Separator tower operates at 145 C (293 F) and 240 psi.

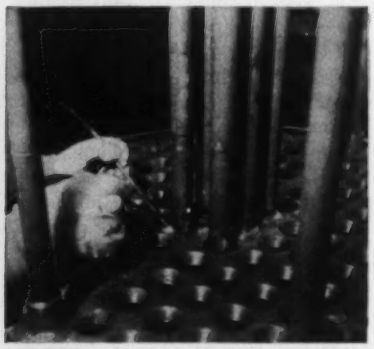
In many cases, the first cost of the coil is lower. Usually this is true where higher steam pressures than those previously used are available—or where expensive, hard-to-fabricate alloys have been used. Improvement of the heating or cooling cycle is another source of savings. Under any circumstances, a long operating life and easy maintenance provide over-all economy.

NUCLEONIC APPLICATIONS. Cupralum with a thicker surfacing of lead is being used increasingly in the nuclear industry. For gamma shields that must be cooled, Cupralum coils are built in to provide efficient heat transfer from the shield to the cooling medium.

Where radioactive liquors and spent resin discharge from demineralizers must be conveyed through process piping into process vessels for concentrating the radioactive solution, Cupralum piping prevents the escape of gamma radiation. In nuclear applications, the lead surfacing may be 1" to 8" thick.



Cutaway section of Cupralum tube. It is produced in 20' lengths or in long continuous coils —from 40' to 100' depending on diameter. It is easy to bend and fabricate. Reliable jointing techniques have been developed.



Lead surfaces of Cupralum tubes and of tube sheet are fused by lead-to-lead welding. Then an extra thickness of lead is applied at the joint for extra protection.

FOR MORE INFORMATION. For detailed data on Cupralum, write Knapp Mills, Inc., Wilmington, Del. Or see your Anaconda representative, who can also provide data on the full line of Anaconda copper and copper-alloy tubes—arrange for technical assistance in meeting special corrosion and heat transfer problems. The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 6971

*Registered trademark of Knapp Mills, Inc.

ANACONDA®

TUBES AND PLATES FOR CONDENSERS AND HEAT EXCHANGERS

Made by The American Brass Company

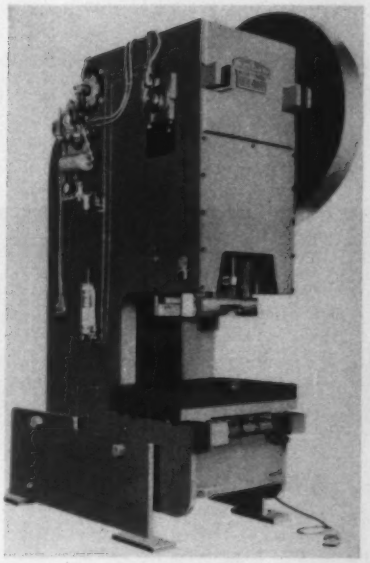
sequences of the unit and do not have to be programed into tape. Those movements include slide locking and unlocking, automatic table retraction, spindle rapid traverse, feed and return, and automatic tape advance.

The tape control system has been designed for easy maintenance. The console design uses transistorized, modular plug-in units. The unit will be shown in Chicago at The Machine Tool Exposition—1960.

For further information, *write* Jigmil Div., De Vlieg Machine Co., 94 Fair Street, Royal Oak, Mich.

OBI Press Line Rated From 75 to 200 Tons

A LINE of OBI presses combines the advantages of welding and the use of steel plate for a stronger structural frame. The units are designed for sheet metal production and permit free access of material from



front to back and right to left.

Each of the units can be inclined in three different positions to accommodate various types of dies and to make use of gravity feed and discharge in automatic production lines.

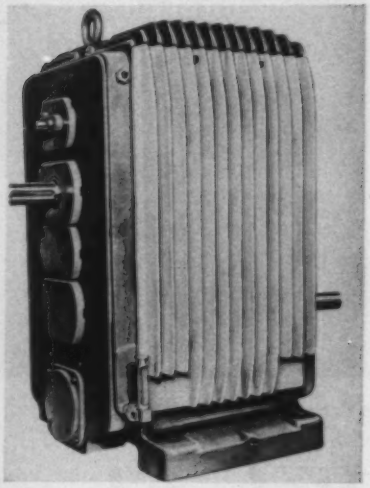
You can get either flywheel or geared drive. The line is equipped with an electrically controlled, air operated friction clutch.

For further information, *write* Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., Cleveland 14, Ohio.

Variable Speed Drive Available in Five Types

YOU CAN meet capacities up to 1500 hp and ratios up to 5.5:1 with a new, constant horsepower, variable speed drive. Drives of 3.8:1 or less can be directly coupled to a 1750 rpm motor.

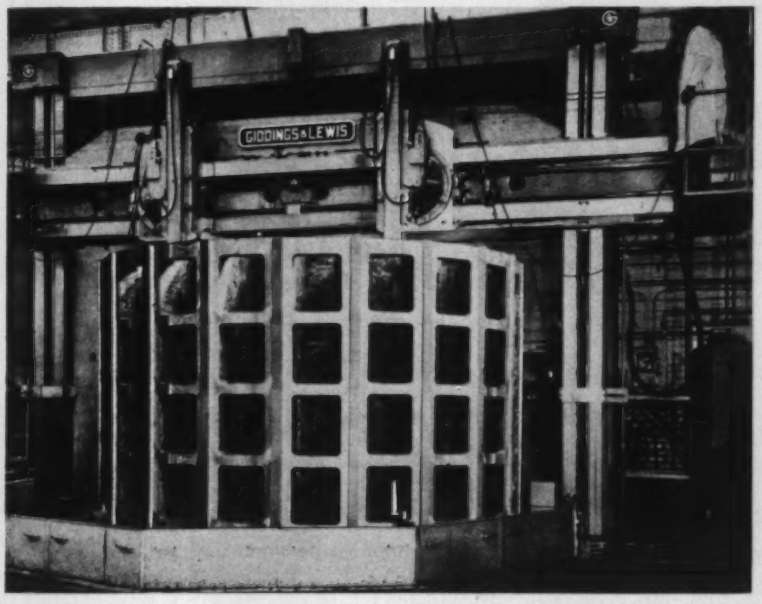
They are available as basic drives, basic drive with output gears, basic



drive with input and output gears, basic drive with integral foot type motor, and basic drive with integral foot type motor and output gears.

The unit has twin strands of single roll chain between a pair of facing wheels having a floating center disc. The diameters of the wheel faces are altered during operation, changing the ratio and the output shaft speed.

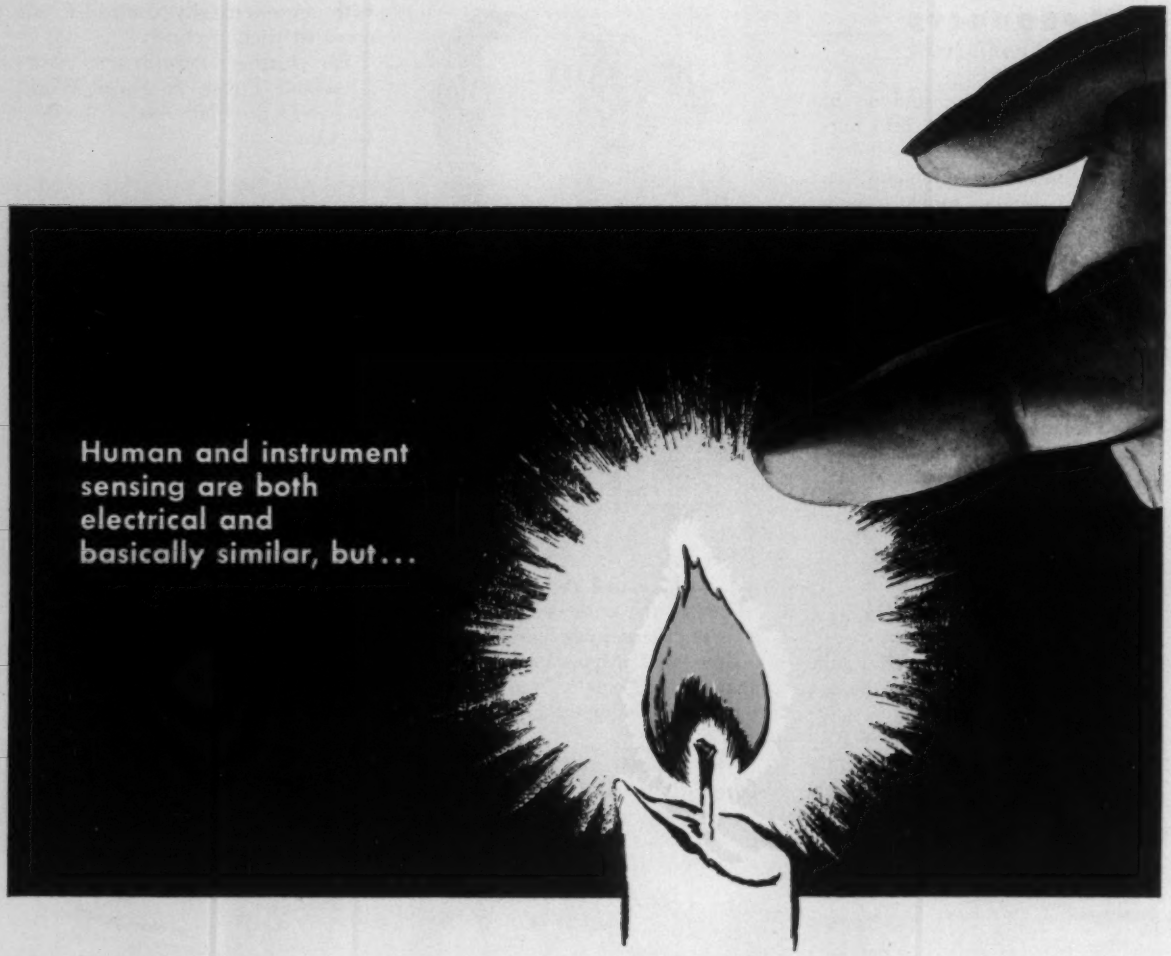
For further information, *write* Dept. PR, Link-Belt Co., Prudential Plaza, Chicago 1, Ill.



DIFFERENT SIZES OF PARTS CAN BE MACHINED efficiently on a new 100 hp vertical boring mill. The unit has a 20 ft swing. The mill has a 12 ft diameter table fitted with a 16 ft diameter table for large parts. The larger table can be removed. The company says table loads up to 75 tons can be handled with ample safety factor. Full table speed range is 0.26 to 22.5 rpm. For further information, **write** Giddings & Lewis Machine Tool Co., 126 Doty St., Fond du Lac, Wis.

Variable Speed Presses Rated Up to 26 Tons

A LINE of variable speed presses permits a speed range ratio of 4:1 in any spread preferred by the user and is offered in 5, 8, 12, 15, 18, and 26 ton capacities. It has con-



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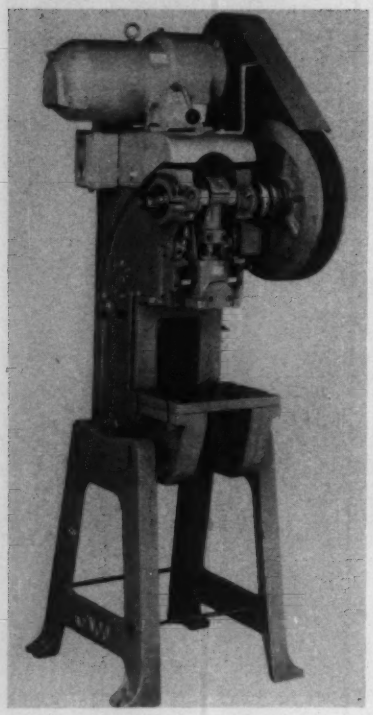


stant horsepower throughout a wide range of variable speeds.

The company says the design can be used for the most economical high speed blanking work and for slow speed drawing operations. The press can be adjusted to stroke at optimum speed when using automatic feed.

The variable speed drive uses a motor equipped with a gear shift transmission that delivers full rated press tonnage through the speed range.

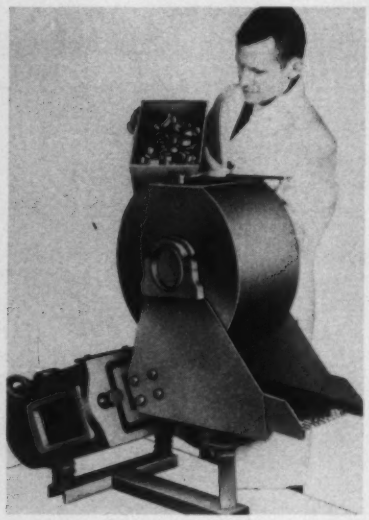
For further information, *write* Kenco Mfg. Co., 5211 Telegraph Rd., Los Angeles 22, Calif.

Barrel Tumbling Unit Does Deburring, Descaling

A VIBRATORY barrel tumbling machine uses electromagnetic vibratory drives for deburring, cleaning, descaling, or other part finishing. Controlled, directional vibration keeps both parts and media agitated and working. Vibration amplitude can be instantly varied, while the frequency of 3600 vibrations per minute is maintained. A rheostat knob on the control box controls the amplitude.

Three models are available with 0.4, 1, and 6 cu ft barrel capacities. Larger models will be available.

Screen covers and hose connections are provided for flushing out compounds and screen troughs to separate parts and media.

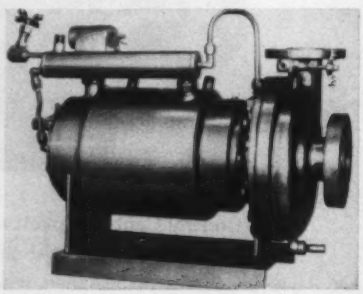


For further information, *write* Syntron Co., 370 Lexington Ave., Homer City, Pa.

Canned Pump Designed for High Temperature Use

A SEALLESS canned pump has an externally mounted heat exchanger for high temperature operation. The units also have water cooling jackets around the motor section.

The pump and motor are in one unit and a portion of the pumped fluid circulates through the motor section between the canned rotor and stator to cool and lubricate.



For further information, *write* Dept. 60, Chempump Div., Fostoria Corp., Huntingdon Valley, Pa.

Whether dry or dripping wet, precision finished metal parts can be protected against rust with a thin, tough, almost invisible .0003″ film of long-lasting, multi-purpose Rust Veto 377.

Rust Veto 377, one of the most popular Houghton Rust Preventives, literally displaces moisture and clings to the metal for complete protection, even in damp, humid indoor conditions. It resists oxidation for as long as a year (indoor storage) and can be used effectively without staining on all types of metal parts either in process or packaged for sale.

Among other Houghton Rust Vetos are fingerprint removers, dry-film solvent-containing types, non-solvent types, concentrates and water displacing materials. They will fill just about every rust prevention need from indoor, between-operation protection to long term protection against outdoor weathering.

For the properties and uses of Rust Veto 377 and other leading Houghton Rust Vetos, write for the new, condensed folder. E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pa.

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From Wisconsin comes wonderful cheese and dairy products, more canned peas than from any other state in the Union, cherries, cranberries and the products of our country's greatest paper mills. Here, is Taliesin-East, Frank Lloyd Wright's famous workshop for architects . . . the white frame house where in 1854 the Republican Party was born . . . the shipbuilding towns along the shores of Lake Michigan . . . millions of acres of game-filled forests, thousands of crystal clear lakes and the best muskellunge fishing in the north. And here, is Milwaukee . . . with its famous "Braves," its great harbor, its sauerbraten, its bratwurst and its . . . Gemütlichkeit.

Here, in Milwaukee, Inland Steel established its first District Office. Here, Inland is not only a supplier of steel, but an intimate part of the whole—buyer of machines and equipment for its mills—mining its limestone at Manestique, iron ore at Ishpeming, Iron River and Crystal Falls in Upper Michigan—building its ore carriers like the giant "Edward L. Ryerson" at Manitowoc.

Today Wisconsin manufacturers look to Inland for sound metallurgical advice, depend upon Inland for prompt steel delivery, know the company's long record of quality and service. *As it has been in the past, Inland is here . . . and here it will be in all of Wisconsin's great tomorrows.*

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NEW literature

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Scrap Handling Systems

Chip and scrap handling systems in four different manufacturing plants are described in Bulletin 900. Advantages are pointed out. Gifford-Wood Co., Hudson, N. Y.

Enameling Steel

An enameling sheet called Bethnamel is discussed in a six page folder (No. 734). The folder describes Bethnamel as ideal for either two coat or direct-on enameling. Bethlehem Steel Co., Bethlehem, Pa.

Welded Roll Design

A folder discusses the design and fabrication of welded rolls. Fatigue strength of weld metal and stress in trunnion disc are included in the presentation. Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio.

Hydrogen Embrittlement

Recommendations for ending hydrogen embrittlement are presented in an 8 page report. The brochure details material control and processing precautions for holding hydrogen pickup within harmless limits in electroplated high strength bolts and nuts. Specify "Emergency Report No. 1—Hydrogen Embrittlement of Cadmium Plated Fasteners." Advertising Dept., Box 579, Standard Pressed Steel Co., Jenkintown, Pa.

Alloy Tubing

"Data Memorandum No. 19" describes Ni-Span C tubing, a heat treatable alloy with a constant modulus of elasticity from −50 to 150° F. In addition, the material has high strength combined with low drift and mechanical hysteresis. Superior Tube Co., 1585 Germantown Ave., Norristown, Pa.

Electrical Standards

A revised set of "Machine Tool Electrical Standards" (as adopted January 25, 1960, by the Electrical Standards Committee of the National Machine Tool Builders' Association) is available in booklet form. National Machine Tool Builders' Association, 2139 Wisconsin Ave., Washington 7, D. C.

Wire Catalog

A 16 page catalog includes helpful information on methods of calculating areas of common shapes; physical properties of steel wire; table of standard wire gages; and hardness conversion tables. Page Steel & Wire Div., American Chain & Cable Co., Monessen, Pa.

Precision Casting

A precision ceramic casting technique for foundry and toolmaking industries is described in a 56 page brochure. The process helps eliminate porosity, cracks, surface inclusions, and other imperfections. Shaw Process Development Corp., 82 Shore Rd., Port Washington, N. Y.

Radiation Safety

A comprehensive, nontechnical series of articles on radiation, called "Question," can serve as an educational tool for personnel. It discusses the nature, use, detection, and control of radiation. R. S. Landauer Jr. & Co., 3920 216th St., Matteson, Ill.

Zirconium Data

The latest technical information is compiled in a new Zirconium Data File. Subjects include production, melting, milling, alloys, fabrication, welding, and electroplating. Zirconium Information Center, Carborundum Metals Co., Akron, N. Y.

Closed Circuit TV

"What Every Businessman Should Know About Closed Circuit TV" explains industrial and commercial television. GPL Div., General Precision Inc., 63 Bedford Rd., Pleasantville, N. Y.

Building Maintenance

Detailed information on general maintenance of interior areas of commercial, industrial, institutional, and public buildings is provided in "Building Maintenance Manual." Service Products Div., Johnson's Wax, Racine, Wis.

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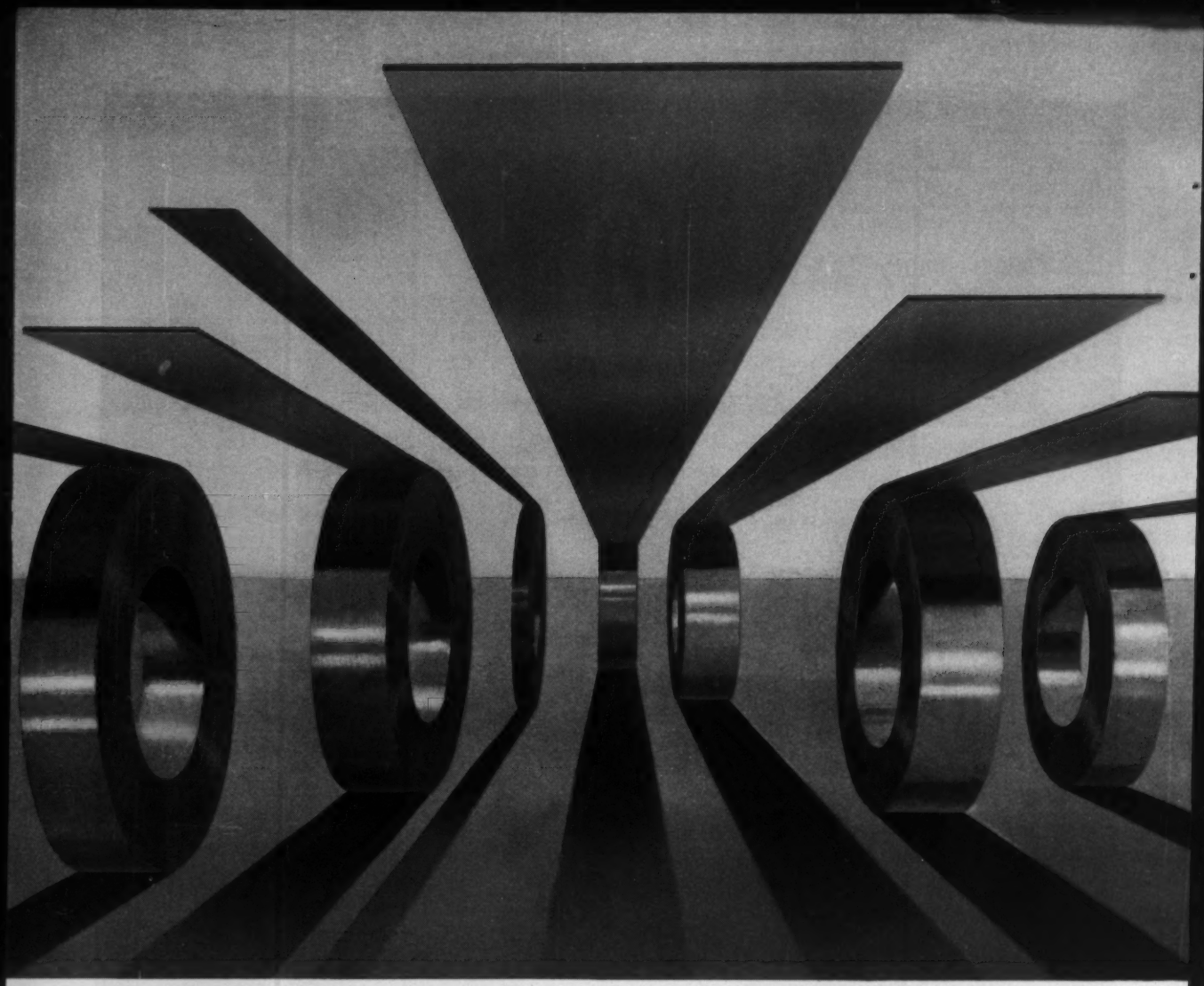

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Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Youngstown 1, Ohio

Rush Orders Presage Upturn

INCREASING demands for fast deliveries may mean that an upturn for steel is just around the corner.

Despite reports that automakers are holding up shipments and can manufacturers are ordering less tin plate than expected, there are encouraging signs that many consumers are running short of steel. Users who would normally be booking tonnage for September are asking instead for late July and early August shipments. At some sales offices, orders are coming in at the best rate since April.

INVENTORIES SHRINK—Since July steel production will be even less than most industry experts predicted—about 6.5 million ingot tons—market analysts are revising their estimates of the finished steel tonnage that users will receive this month. At most, domestic shipments won't exceed 4.5 million tons—the smallest volume of any nonstrike month since July, 1958. Assuming consumption of at least 6 million tons, user inventories will shrink by 1.5 million. If consumption reaches 6.5 million tons—as some analysts predict—there will be a 2-million-ton drop in stockpiles.

At the beginning of the month, it was believed that consumer inventories were about 16.5 million tons. If they fall to 14.5 million tons by July 31, they'll be within 1 million tons of the level that is generally regarded as a working minimum. You can expect liquidation to end next month.

AUTOMAKERS WILL LEAD—When the upturn comes, automakers will lead the way. When they start releasing big orders, the market will tighten, and steelmakers will have to quote longer deliveries. When that happens, smaller users will come into the market with a rush. They'll all try to build inventories simultaneously, forcing the mills to quote even longer deliveries.

OTHERS MUST FOLLOW—As demand gains momentum, market analysts will look for additional support from machinery builders. There's a good chance for an upturn in this segment of the market because plans for capital spending are in excess of what's being done. If first half corporate profits are big enough to justify expenditures for new equipment, demand for plates and cold finished bars will improve appreciably. Nonresidential construction and railroad carbuilding will also contribute to the upswing. Both should require more steel than they consumed in 1959.

APPLIANCES NO HELP—Don't expect household appliances to spark the upturn. They're not expected to take as much steel as they did last year. The same applies to oil and gas drilling, housing starts, electrical machinery, cans, tractors, farm equipment, and service centers.

EXPORT TREND REVERSED—In May, U. S. exports of finished steel products (320,000 tons) exceeded imports (272,000 tons) for the first time since December, 1958. Comparison of May figures with those of March shows that the biggest gains and losses were in sheets and strip. Exports jumped 350 per cent while imports dropped 86 per cent. Plate imports fell 60 per cent and structural shapes (plain 3 in. and over) 55 per cent. Other imports didn't fare so badly. Examples: Pipe and tubing dropped 17 per cent, wire rods and nails 15 per cent, and reinforcing bars 12 per cent. They'll continue to harass domestic producers.

PRODUCTION RISES—Last week, steelmaking operations climbed 2.8 points to 54.6 per cent of capacity. Production was about 1,556,000 ingot tons.

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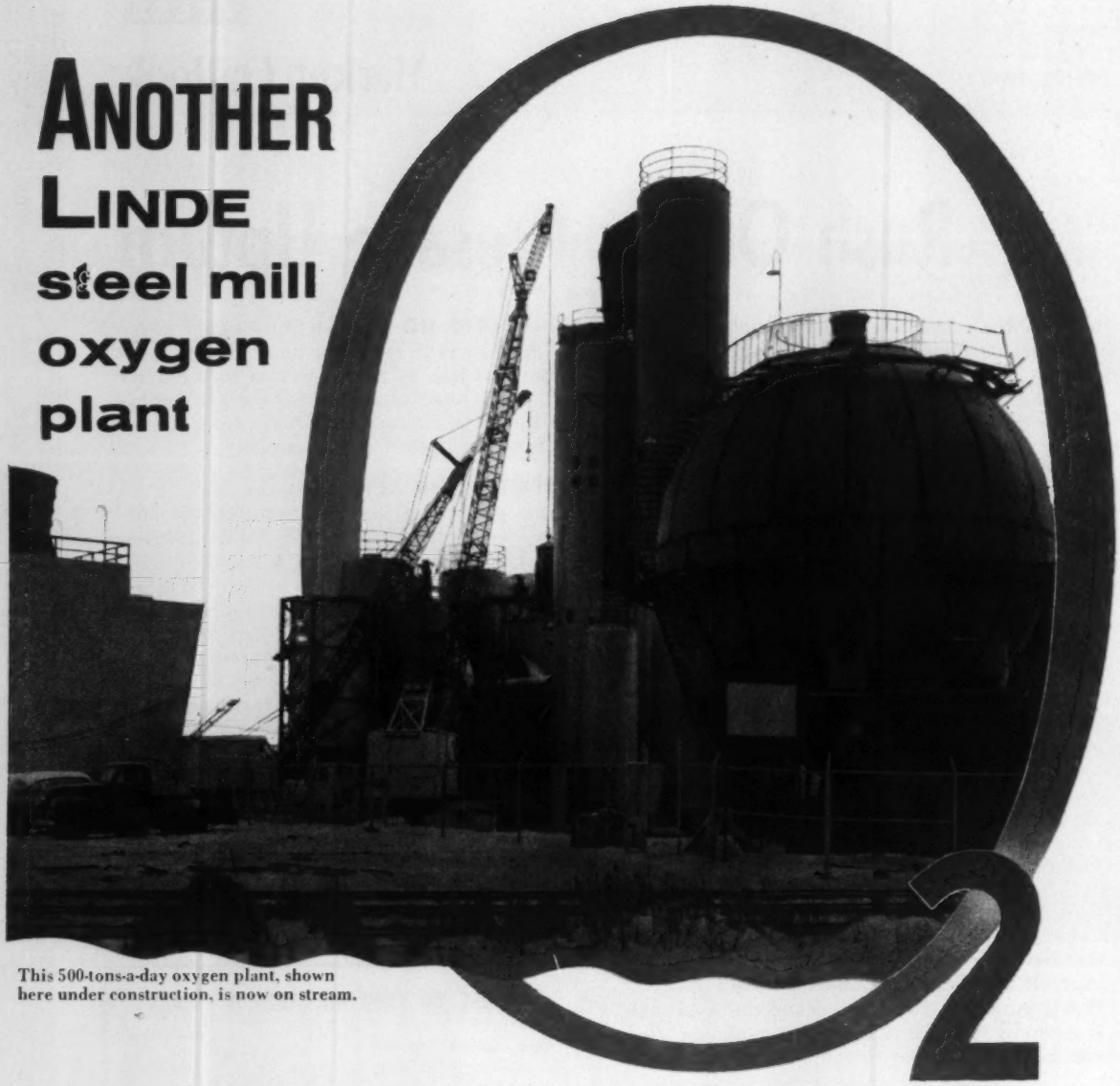
*Current prices were published in the July 18 issue and will appear in subsequent issues.

ANOTHER LINDE steel mill oxygen plant



This 500-tons-a-day oxygen plant, shown here under construction, is now on stream.

...with no capital investment

Steel producers are buying more and more LINDE oxygen. Since 1955 LINDE has put on-stream close to an average of one plant a month, most of them feeding oxygen to steel's furnaces. The 500-tons-a-day plant shown above is one of these.

Steelmen like the system—

- Because LINDE invests the capital, pays the labor, buys the power, and guarantees oxygen supply for steelmaking.
- Because steelmen make the steel—and LINDE makes the oxygen.
- Because steel money buys steel facilities—and LINDE buys oxygen capacity.

Right now, LINDE is building more than $50,000,000 worth of new oxygen facilities. Production will soon begin at new or expanded facilities at 16 locations. Oxygen capacity will jump by more than 4,000 tons a day.

This means—more single customer plants . . . more liquid oxygen to back up those on-site plants.

Absolute dependability—

Every plant has to be shut down some time. But, there are more than 100 locations where LINDE is producing or has bulk quantities of liquid oxygen in storage. This is a degree of *back-up insurance* no one else can approach.

For your *guaranteed* supply at lowest possible overall cost, call LINDE COMPANY, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. Offices in other principal cities. *In Canada:* Linde Company, Division of Union Carbide Canada Limited, Toronto 7, Ontario.

LINDE COMPANY **UNION CARBIDE**

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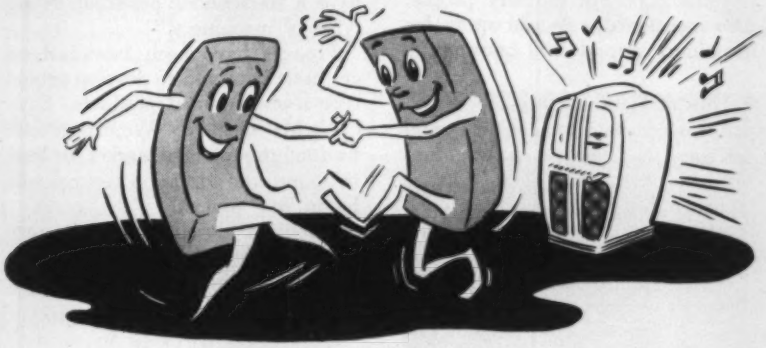
Shakes, Rattles, Roars



. . . Lead Loves Them

LEAD people hope to develop an important new market out of shakes, rattles, and roars.

They know they have a good thing because the control of sound and vibration is becoming increasingly vital in many areas. In architecture, for example, the move toward airiness and the open look has created a new set of problems. And the need for noise and vibration control has been accentuated by greater use of complex equipment in the home, office, and factory.

• **How It Works**—Watch how a sponge sops up water, and you'll see just what happens when high frequency sound or vibration comes in contact with lead. Technically, this is known as internal damping (sound is converted into heat energy).

When sounds and vibrations of low frequencies (the kinds that bother human ears) contact lead, two things happen: Part of the sound is absorbed as in high frequencies, the other part bounces back—similar to a tennis ball hitting a wall. It means that lead forms a barrier which effectively denies passage to sound and vibration.

Lead's antisound and vibration qualities are due to two metallurgical traits: It's limp—like a wet dishcloth, and it has high density. Both characteristics are necessary in a good sound and vibration damping material.

Those properties have been known for years, but real interest in the application is recent. But it now looks like a major breakthrough in use may be in the making!

R. L. Ziegfeld, secretary of the Lead Industries Association, reports that his group has had more inquiries for information in the last six months than in the previous 20 years. Requests for data on lead-asbestos antivibration pads alone have hit 1000 in the last six months, and they're currently running at a rate of about 45 a week.

"For the first time, designers and engineers in general are thinking of lead as a sound and vibration control material," says Mr. Ziegfeld.

• **Where Lead Is Used** — Small amounts of lead now going into sound and vibration control fall into three categories: 1. Lead-asbestos pads. 2. Sheet lead and laminated plastics. 3. Leaded plastics.

By far the biggest market is in lead-asbestos pads for vibration control. One such use is in building foundations to prevent transmission of vibration from the ground into the structure. The recently completed, 54 story Union Carbide Corp. building in New York City has 115 such pads incorporated in the foundation. They'll also be used in Grand Central City, said to be the world's largest office building. (It's scheduled for completion in 1962.) So will the Philharmonic Hall at the Lincoln Center for the Performing Arts in New York City. (It's under construction.)

Probably the biggest potential for lead-asbestos pads is in roof top cooling towers for commercial air conditioning equipment. One of the first installations was on a 35 story office building in New York. The cooling tower, with a wet weight of 205,000 lb, is supported on ten steel angle columns resting on the building's own structural girders. The tower's posts rest on ten lead-asbestos pads which provide an antivibration bearing surface of 928 sq in., or about 220 psi.

The air conditioning field holds promise of becoming a 50,000-ton-a-year market for lead, says Mr. Ziegfeld. The potential is also bright for antivibration pads in central home air conditioning, he believes.

Other uses, current and potential: All types of heavy machinery compressors, printing presses, laundry equipment.

• **Sound Barriers**—The potentials for lead in sound control may be even greater than they are for antivibration applications—though the area is less explored and less developed. When the vibrations created by a loud noise come in contact with lead, they are unable to pass through. As one lead man puts it: "It's like trying to ring a bell in mashed potatoes."

Sheet lead has been traditionally used in this application. For example, the studios of the National Broadcasting Co. in New York have 112 doors that are soundproofed with 0.0625 in. sheet lead. Now it seems that lead in combination with plastics offers the versatility that could open a full scale market.

Currently, the most promising of the lead-plastic combinations appears to be the leaded vinyls. Cordo Chemical Co., Norwalk, Conn., one of the pioneers in the field, explains that the product consists of lead powder dispersed in a vinyl and then coated to a fabric. The product runs 66 to 75 per cent lead by weight and can be colored and embossed, says Fred Hall, Cordo sales manager.

The biggest immediate potential appears to be in building products. Lead researchers mention such possible growth areas as movable par-

titions, ceiling materials, flooring, doors, windows, portable space dividers, and air conditioning ducts.

One of the best prospects is business machines, says Mr. Hall. He also mentions machinery surfaces; small spot applications (like a noisy part on an appliance).

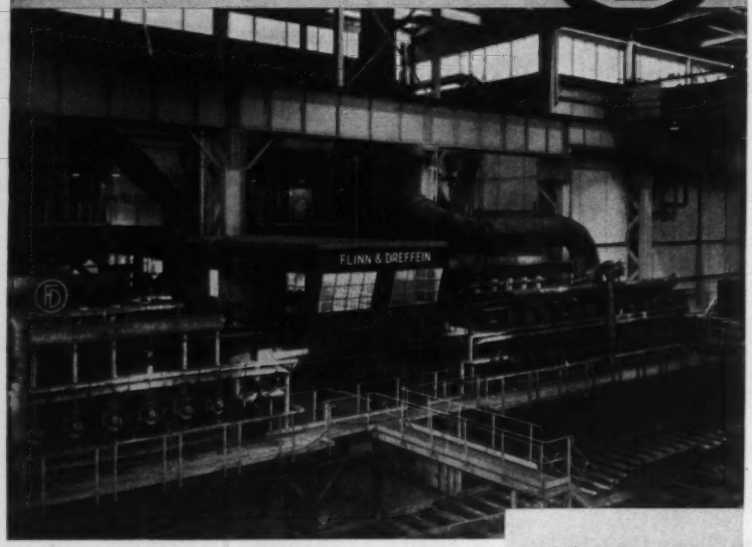
The Navy has been experimenting with a number of lead compounds for hull damping on some of its new ships. Applied to the inside of the pressure hull, the material keeps vibrations from affecting sonar equipment. The same type of material might be used in machinery housing to control sound vibrations, believe industry people. Also mentioned: A lead spray for machinery shrouds and housings.

• **Lack of Data**—A lack of test and performance data for engineers and designers has been a major stumbling block to wide scale acceptance of lead's usage as a sound and vibration attenuator. Frank Kiernan, treasurer, J. F. Abernethy & Co., Brooklyn (a leading maker of lead-asbestos pads), says that when sufficient data are available "we will have a tremendous potential in all types of machinery."

Projects have been launched to get basic data and to develop prototype lead-contained products. Says LIA's Mr. Ziegfeld: "We expect that by 1965 the tonnage market for lead in sound and vibration control will be in five figures."

About a dozen companies are manufacturing lead-based products; perhaps another two dozen are set to enter the field.

. . . another first by Flinn & Dreffein . . .



Two new "Flinn & Dreffein Designed" 5-zone reheat furnaces made news recently when they were placed in operation at the new structural mill of United States Steel Corporation's South Works plant at Chicago.

The demand for larger sections, tonnage capacities and flexibility of heating operation dictated this advanced design.

Once again, Flinn and Dreffein experience and know-how reflected by user's confidence inspired Flinn and Dreffein engineers to further the development of reheat furnaces using the latest techniques and materials in furnace design.

F & D Furnaces . . . for more than half-a-century . . .

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Gas and oil fired or electrically heated.

FLINN & DREFFEIN ENGINEERING CO.
36 S. Wabash Ave., Chicago 3, Ill.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 160

Reinforcing bars provide one of the few bright spots in the nonflat rolled product business. A substantial amount of orders for rebars is on hand and new business is coming in steadily in many districts. A producer in the St. Louis district says the rebar situation "looks good" for several months.

The situation is not favorable in all areas. A combination of reduced demand and imports is raising havoc with domestic producers on the West Coast. An example of the competition: Foreign reinforcing bars are selling in the West Coast market at prices $20 to $30 a ton under quotations for domestic products.

Steel Bars . . .

Bar Prices, Page 159

Bar business is poor. Bookings of hot and cold drawn carbon and hot alloy bars have declined steadily since May. The delivery cycle generally is three weeks and in some categories as little as one week.

Cold finished bar producers welcomed the opportunity to close their plants for vacations because recent bookings haven't been large enough to support economical operations. Sales executives hope to accumulate some orders before reopening, but they're not optimistic. Customers have big inventories of bars and warehouses are full of finished goods.

For some cold finishers in the Pittsburgh area, the decline started last month. Although operations and shipments remained at a fairly high level—dropping from 85 to 70 per cent of capacity—new orders fell sharply. Bookings for August have

been poor, so it's doubtful that vacationing firms will operate at more than half of capacity when they reopen. Given some impetus from automotive buying, operations may rise to 65 or 70 per cent of capacity in the fall.

Wire . . .

Wire Prices, Pages 161 & 162

No improvement is noted in demand for wire products. Most merchant wire products can be made from stock and producers of manufacturers' wire have no difficulty in shipping within three to four weeks. Offerings of imported material remain a factor in the market, especially along the coastal regions, but it is not quite as strong as it was earlier in the year.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 160 & 161

Buyers of flat rolled steel products are requesting quick delivery. Emphasis on the time element indicates, producers say, that consumer inventories are getting low. Sales officials report that buyers who would normally be booking tonnage for September are asking instead for late July or early August shipments.

The Pittsburgh sales office of a leading sheet producer reports orders are coming in at the best rate since April; July bookings are up 65 per cent from last month's. Other producers are less optimistic. Typical comment: "We don't see much to get excited about in August. It probably won't be much better than July. We were apprehensive about the early part of the month. We could take an order right now (July 18) and ship it in the week of Aug. 8."

Demand for hot rolled and long terne sheets will probably improve in August, but there are no signs of a pickup for other flat rolled products. Demand for galvanized sheets is expected to decline. It's hoped that Chrysler Corp.—which has been soft pedaling its August requirements—will give steel suppliers the go-ahead when it finishes taking inventory.

Galvanized sheet mills are running at fairly normal rates in contrast with operations in other sheet lines. Deliveries range three to four weeks in the East and Midwest.

Hot and cold sheets are moving

For heavy-duty protection under paint

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Oakite CrysCoat® zinc phosphate coatings keep rain and rust from ruining steel

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First, it locks paint and steel together. Then, it beats back corrosion at any point of future paint damage. Test panels usually last well over 1,000 hours in salt spray tests—*four times* the 250 hours required by government specifications.

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In the family of Oakite CrysCoat processes there are zinc phosphate as well as iron phosphate materials . . . for spray application and for tank dip . . . for room temperature or heated operation. You can count on *all* to give products lasting protection, lasting appeal. But there's a *right* one to match your protection and/or economic requirements. Ask the Oakite man to help you select it. Meanwhile, write for Bulletin F-8979. Oakite Products, Inc., 38H Rector Street, New York 6, N. Y.

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slowly, indicating what may be expected over the next several weeks. At present, hot sheets can be had within two to three weeks. Electrical sheets and enameling stock, reflecting particularly the lag in household appliance production, can be had from stock in some instances.

Plates . . .

Plate Prices, Page 159

Plate fabricating shops are operating largely off inventories. That has resulted in a reduction in stocks despite a further decline in actual consumption. Buying is expected to be light through the third quarter, although order entry is expected to gain during August and September.

Sheared plate producers are quoting ten days to two weeks delivery. Although business is sluggish in practically all lines, requirements for missile fuel tanks are holding up fairly well.

On the limited plate tonnage being estimated for fabrication, prices are subject to severe competition. On the West Coast, domestic prices for steel plates are being undercut by foreign sources by as much as $25 a ton.

Tin Plate . . .

Tin Plate Prices, Page 161

The brightest spot in the West Coast steel market is provided by tin plate. Columbia-Geneva Steel Div., U. S. Steel Corp., is operating its tin lines at capacity. Its new continuous annealing line is just nearing its full potential after a two month "shakedown."

The highly concentrated activity in tin plate products at the Pittsburg Works indicates the division's next expansion move there will be installation of a hot strip mill. The division now draws coils from its Geneva, Utah, plant. It has plans for a 66 in. strip mill at Pittsburg, and has just added acreage at the plant site.

Coast demand for tin mill products from the heavy concentration of canmaking firms in the area is strong. It is rarely necessary for Columbia-Geneva to go beyond 100 miles of its works to sell all the tin plate it can produce.

Imported Steel . . .

Imported Steel Prices, Page 187

Steel imports into the port of Chicago via the St. Lawrence Seaway in June totaled 9231 tons, reports the Chicago Association of Commerce & Industry. In June, 1959, imports amounted to 35,635 tons.

Through June, this year, waterborne steel imports at 28,326 tons were running nearly 50,000 tons behind those in the comparable period last year.

Wire rods made up 32 per cent of the total imports (via water) of basic steel products this year; structural steel, 22 per cent; tubing and piping, 15; nuts, bolts, screws, and washers, 10; bars, 9; wire and wire products, 9; sheets, 2.

Fifty-seven per cent of those items were imported from Antwerp. Rotterdam accounted for 22; Genoa, 8; Hamburg, 6; Bremen and Gothenburg, 2 each; and London, Le Havre, and Manchester, 1 per cent each.

Imports of finished steel products at Houston dropped to a two year

. . . withstand temperatures to 3,500° F., extreme abrasion, slag formation

These refractories form exceptionally stable, non-wetting linings that have amazing load-bearing strength and resistance to ferrous metal penetration.

80-95% Alumina . . . New Pli-Ram Mixes are specially formulated from select ores for high temperature installations where molten aluminum and iron oxide are the chief causes of lining failure.

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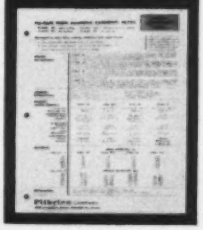
- Brass and aluminum ladles
- Ladles for carbon and alloy steels
- Electric furnace roofs
- Slab reheat hearths
- Foundry mixing ladles

Pli-Ram "80" (heat setting)
Pli-Ram "80-S" (chemical and heat setting)
Pli-Ram "90" (air setting)
Pli-Ram "95" (air setting)



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low of 25,596 tons in June. In comparison, 40,000 tons were imported in May. The June, 1959, import tonnage was 70,081.

One factor: The Houston area market was flooded with imports during the steel strike. Generally slow business also figured in the decline.

There was speculation that the lowered import rate might lead to a better than expected third quarter demand on the domestic market.

Rods and reinforcing bars, in particular, have been supplied by the foreign markets. There has been a slight pickup in demand for plates in Houston, due to placing of an order with one mill, but the call for other items is below par.

Buffalo Mill Ships Steel To Europe via the Seaway

The *S.S. Esmeralda,* the first Argentine vessel to use the St. Lawrence Seaway, recently loaded 6000 tons of steel billets at Algoma, Ont., for shipment to West Germany. A similar cargo was shipped from Algoma the preceding week, and still another shipment of 6000 tons for Germany is scheduled.

The first shipment of finished steel to be moved from Buffalo area mills to Europe by way of the St. Lawrence Seaway was loaded recently at a district waterfront terminal. The 650 tons of sheets and coils is destined for the United Kingdom aboard a Swedish freighter.

Area vessel agents said they have been working on the development of steel shipments to Europe from the area for the last five years. Another overseas shipment from the Bethlehem mill — 625 tons — is scheduled to be loaded July 27.

Distributors . . .

Prices, Page 166

Service center sales dropped sharply this month in most districts and are expected to remain low through August. Vacations at consuming plants this month have cut heavily into requirements and, while the suspensions will be a factor next month, they likely will not have as much effect.

Sluggishness has been more pronounced this year than usual for another reason: Users are reducing their inventories to levels which are warranted by current business activity. The slowdown has prompted price shading.

While steel imports are not pressing as heavily on the market as they were earlier in the year, the influence of foreign materials is generally apparent. The effect of Japan's invasion of the Alaskan market is expected to be an increasing challenge to suppliers of domestic products.

Structural Shapes . . .

Structural Shape Prices, Page 159

Structural fabricators are encouraged by the increase in inquiry, primarily for public works but including a growing amount of industrial and commercial construction. Some fabricators are able to sustain order backlogs and in a few instances to increase them.

Certain of the larger shops can promise little for shipment under four months; the medium size plants, from two to two and one-half

ERIE Bolts • Studs • Cap Screws • Nuts
In Alloys • Stainless • Carbon • Bronze

Experienced eyes sharpened by modern instruments verify microscopic details of thread accuracy here . . . proof of painstaking craftsmanship in meeting your special design specifications for fasteners as well as government National Standards . . . Fasteners designed and crafted to resist corrosion, temperature and stress have been our exclusive job since 1913. All this, plus experienced precision manufacture of bolting for special applications, is yours when you send your specifications to us.

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REPUBLIC INDUSTRIAL CORPORATION

ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives In Principal Cities

Your ideal source for custom-designed cranes—CONCO

This unique installation combines a 2-ton, 38'5" span circular crane and a 20-ton, 24'2" span annular crane, each with a 130' lift. One engineering problem solved: On the annular crane the outside wheels must travel at 195 FPM; the inside wheels at 125 FPM. Conco builds cranes for virtually every class of service, including specialized spark and explosion-proof cranes, two-hook cranes, and cranes employing closed-circuit TV remote control operation. A complete design service, including sample specifications, is available. Write us for bulletin 500B covering the Conco line of cranes, hoists and trolleys.

CRANES HOISTS CONCO

Material Handling Division
Conco Engineering Works, Inc., 70 14th Ave., Mendota, Ill.
AFFILIATES: Sparton Tool Division—Powered Sewer Cleaning Equipment
Field Control Division—Barometric Draft Controls
Conco Building Products, Inc.—Brick, Tile, Stone

Special set-up cuts work handling

Combining ingenuity and standard tooling provides a work saving set-up for "big" drilling jobs at Electric Box and Switchboard Company, Chicago. Formerly, 150 to 200 holes in 40 X 72" ebony asbestos and steel switchboard panels were drilled with a conventional drill press, then the work was moved to another location for additional drilling. Now the entire job is completed by one standard Delta Overhead Drill Press. By suspending the drill press from a track 40" long and putting casters on the work table, extra handling and positioning are reduced and special jigs and fixtures eliminated. Set-up permits drilling at any point on a circle 23¾" in diameter.

This is typical of how rugged, versatile Delta Industrial Tools are used throughout industry to supplement or replace costly single purpose machines. For free illustrated booklet of valuable cost-cutting ideas, write: Rockwell Manufacturing Company, Delta Power Tool Division, 638G N. Lexington Ave., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Company of Canada, Ltd., Box 420, Guelph, Ontario.

months; and the small shops, less than that on an average.

Bridges and schools account for the bulk of fabricated structural steel estimating in New England. Competition for steelwork is sharp and prices are subject to pressure. Shops are placing light orders with mills which can make deliveries in about three weeks. With deliveries available on a leadtime of less than one month, most fabricators hold off buying plain material until contract for fabricated tonnage is booked.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5265 tons, superstructure, American River span, Sault Ste. Marie International bridge, Sault Ste. Marie, Mich.-Ontario, to Bethlehem Steel Co., Bethlehem, Pa.

3450 tons, superstructure, bridge, Tennessee River project 2 B1, part B, Natchez Trace parkway, Alabama, to Ingalls Steel Construction Co., Birmingham.

2500 tons, executive and administration center, American Cyanamid Co., Wayne Township, N. J., to Harris Structural Steel Co., New York.

2364 tons, government furnished, schedule V, 345 kv transmission line, King County, Washington; Charles T. Parker Co., Portland, Oreg., low $724,000 for erection, to Bonneville Power Administration, Portland.

1500 tons, building, Chemical Bank-New York Trust Co., through George A. Fuller Co., general contractor, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

1314 tons, state highway bridges, Dayton and Mingo Junction, Ohio, to American Bridge Div., U. S. Steel Corp., Pittsburgh; Penker Construction Co., Cincinnati, general contractor.

1200 tons, eight state highway bridges, Interstate Route 95, Federal aid project 1-95-2(3)36, Providence, R. I., to Phoenix Bridge Co., Phoenixville, Pa.; M. A. Gammino Construction Co., Providence, general contractor; concrete reinforcing bars to Plantations Steel Co., Providence.

1095 tons, apartment, East Orange, N. J., through Tandy & Allen, general contractors, to Irvington Steel & Iron Works, New Brunswick, N. J.

1000 tons, factory, Garden State Paper Co., Garfield, N. J., through Joseph Mucarelle, general contractor, to Elizabeth Iron Works Inc., Union, N. J.

960 tons, plant and laboratory, Yardley of London, Totowa, N. J., to Schacht Steel Construction Inc., New York.

665 tons, two state highway bridges, Naugatuck, Conn., to American Bridge Div., U. S. Steel Corp., Pittsburgh; Burnalli Construction Co., Southington, Conn., general contractor.

615 tons, Menlo Park shopping center (including theater), Edson Township, N. J., through Sommers Bros., general contractors, to Keystone Structural Steel Co., Trenton, N. J.

450 tons, state bridge, Wicomico, Md., to the Atlas Machine & Steel Foundry Co.

400 tons, including reinforcing bars, high school, Weston, Mass., to Haarmann Steel Co., Holyoke, Mass.; Daniel O'Connell's Sons Inc., Holyoke, general contractor; concrete reinforcing bars to Joseph T. Ryerson & Son Inc., Boston.

392 tons, right field bleachers, Denver Bear Stadium, Denver, to Burkhardt Steel Co., that city.

355 tons, office and warehouse, General Electric Co., Cleveland, to Builders Structural Steel Corp., Cleveland.

286 tons, six state highway bridges, Chelmsford-Lowell, Mass., to Tower Iron Works, Providence, R. I.; Campanella & Cardi

O-KNI-CO

METALWORKING news

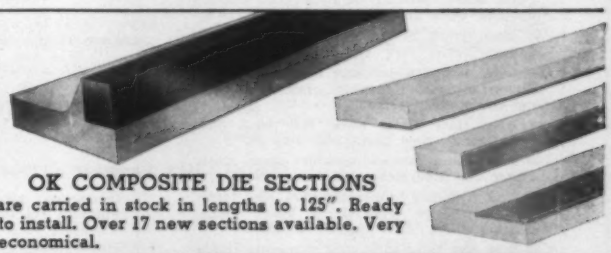
PRODUCTION FACTS THAT INCREASE YOUR PROFITS

PUBLISHED BY THE OHIO KNIFE CO., CINCINNATI, OHIO

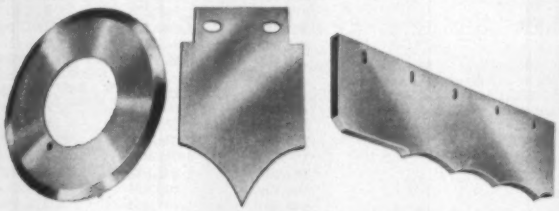
MANY COMPANIES NOW CUTTING PRODUCTION COSTS — INCREASING MACHINE LIFE AND ACCURACY WITH THESE OHIO KNIFE CO. HARDENED PRODUCTS

The products shown here are just a few of hundreds made by The Ohio Knife Co. of Cincinnati, Ohio. They are widely used as components by machine builders and as replacements when ordinary parts wear or break. The Knife Co. is internationally famous for their special hardening techniques, resulting in a reputation for producing products with long wear qualities. Many products are made by bonding high speed steel, tool steel or alloy steel to a mild backing. This gives the finest wear resistant surface possible. Perfect bonding is assured through use of a 2,500 ton forging press and rolling mill. Other products are especially hardened to meet the requirements of the job. All products are meticulously ground to extremely close tolerances. Specific bulletins are available FREE on all products.

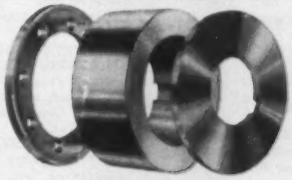
OK STANDARD CUT-OFF BLADES
carried in stock for many holders and machines. Also blades made to your prints or specifications.



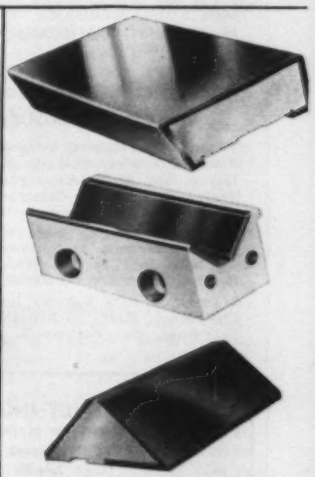
OK COMPOSITE DIE SECTIONS
are carried in stock in lengths to 125". Ready to install. Over 17 new sections available. Very economical.



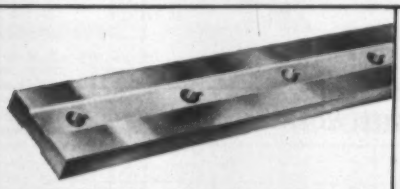
OK TUBE CUT-OFF BLADES
widely used in the manufacture of welded tubes.



OK ROTARY METAL SLITTING KNIVES AND SPACERS
in a complete range of sizes.

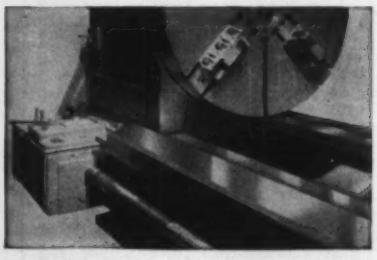


OK WAYS—GIBS
are practically wear-proof. Also available in aluminum bronze. Complete selection

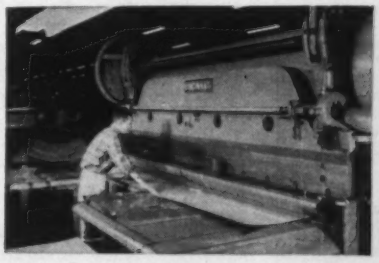


OK SOLID STEEL SHEAR BLADES
for all types shears and any type of shearing requirement.

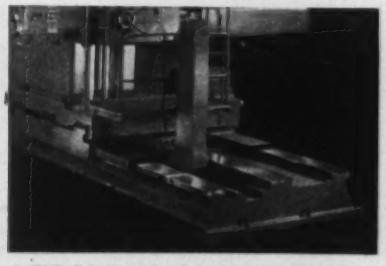
OK CENTERLESS GRINDER BLADES
Complete range of sizes and designs carried in stock for quick delivery.



O-KNI-CO processed hardened ways on 60 inch lathe made by The Niles Tool Works.



65 ton Cincinnati Press Brake equipped with long-wearing O-KNI-CO processed shear blades.



O-KNI-CO hardened bedways, cross ways on a G. A. Gray Co. horizontal boring machine.

FREE BULLETINS AVAILABLE • THE OHIO KNIFE CO., DEPT. 110-AF • CINCINNATI 23, OHIO

Construction Co., Hillsgrove, R. I., general contractor.

170 tons, dormitory and dinning, hall, University of Vermont, Burlington, Vt., to Vermont Structural Steel Co., Burlington; Wright & Morrissey Inc., Burlington, general contractor.

119 tons, office building, National Western Life Insurance Co., Denver, to Burkhardt Steel Co., that city.

100 tons, two bridges involved in Mayfield dam power project, Tacoma, Wash., to Pacific Coast Div., Bethlehem Steel Co., Seattle.

STRUCTURAL STEEL PENDING

6300 tons, plant, Kaiser Aluminum & Chemical Co., Ravenswood, West Va.; pending.

2205 tons, state bridge work, Richmond County, New York; bids July 28.

2000 tons, building, Miami Herald Publishing Co., Miami, Fla.; bids closed July 19.

1030 tons, state bridge work, TSP 50-2, Columbia County, New York; bids July 28.

1014 tons, state bridge work, FARC 60-121, Broome County, New York; bids July 28.

1000 tons, apartment house development, Elizabeth, N. J.; bids asked.

950 tons, oil processing facilities, M. W. Kellogg Co., Texas City, Tex.; pending.

800 tons, filtration and pumping plant, Allen Park, Mich.; pending. A substantial amount of tank work also is pending.

758 tons, state bridge work, FARC 60-127, Seneca County, New York; bids July 28.

530 tons, 14th Street bridge approach, Washington; John F. Casey Co., Pittsburgh, low on general contract.

302 tons, state bridge work, HSP 50-1, Suffolk County, New York; bids July 28.

150 tons, foam molded container plant, Scott Paper Co., Eddystone, Pa.; bids closed.

143 tons, including reinforcing bars, one, three-span composite, wide flange beam bridge, Sherburne, Vt.; bids Aug. 12, Montpelier.

130 tons, one three-span wide composite flange beam bridge, Westminster, Vt.; bids Aug. 19, Montpelier; also 95 tons, concrete reinforcing bars.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1572 tons, state highway bridges, Mingo Junction and Dayton, Ohio, to Macomber Co., Dayton and Mt. Vernon Bridge Co., Mt. Vernon, Ohio; Penker Construction Co., Cincinnati, general contractor.

780 tons, Washington state highway headquarters, Olympia, to Northwest Steel Rolling Mills Inc., Seattle; Wick Construction Co., Seattle, general contractor at $1,935,000.

695 tons, six state highway bridges, Lowell-Chelmsford, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Campanella & Cardi Construction Co., Hillsgrove, R. I., general contractor.

667 tons, science building, Louisiana State University, New Orleans, to Orleans Materials & Equipment Co., New Orleans; Keller Construction Co., New Orleans, general contractor; 50 tons, structurals to Metal Building Products Co., New Orleans.

600 tons, dormitories and dining hall, University of Vermont, Burlington, Vt., to Bethlehem Steel Co., Bethlehem, Pa.; Wright & Morrissey Inc., Burlington, general contractor.

570 tons, hospital addition, Vanderbilt University, Nashville, Tenn., to McCarthy-Jones & Woodard, Nashville; Foster & Creighton Co., Nashville, general contractor.

370 tons, Washington state employment security department building, Olympia, to J. D. English Steel Co., Tacoma; Dolph Jones, Tacoma, general contractor at $1 million.

REINFORCING BARS PENDING

985 tons, Washington state Columbia River Vantage bridge piers; Manson Construction & Engineering Co., Seattle, general contractor at $1,525,380.

105 tons, state highway structures, including drainage, Putney-Westminster, Vt.; bids Aug. 12, Montpelier.

PLATES . . .

PLATES PLACED

1400 tons, 54 in. water supply line, Tolt River project, Seattle, to Beall Pipe & Tank Corp., Portland, Oreg., under subcontract from Valley Construction Co. and Morrison-Knudsen Co., Seattle, joint general contractors at $938,032.

425 tons, medium black, various sizes, Naval shipyard, Philadelphia, to Alan Wood Steel Co., Conshohocken, Pa.

235 tons, hull, carbon, Navy, General Stores Supply, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.

200 tons, molasses tank, Standard Brands Inc., New York, to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

1259 tons, high tensile, grade Hy-80, Navy Purchasing office, Washington, D. C.

165 tons, tanks, Hess Oil Co., Port Reading, N. J.; pending.

PIPE . . .

CAST IRON PIPE PLACED

218 tons, 6 to 12 in. cast iron pipe for Tacoma, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

100 tons plus, various sizes for Milton, Puyallup, and King counties, Washington, to Pacific States Cast Iron Pipe Co., Seattle.

100 tons, including 51 tons of 8 and 10 in. pipe, for Ellensburg, Wash., to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

1470 tons, 4 to 12 in. cast iron pipe; bids to Seattle, July 20.

Steel Product Shipments by Markets—May, 1960

(Net tons, all grades)

Markets:	May Shipments	First Five Months 1960	1959
Converting, processing	241,407	1,628,802	1,564,316
Forgings (except auto)	67,307	481,089	509,331
Fasteners	80,066	603,730	631,208
Warehouses	1,094,860	6,726,475	6,961,779
Construction	916,341	4,689,792	4,835,595
Contractors' products	341,248	1,895,223	1,971,452
Automotive	1,060,029	7,549,177	8,180,100
Rail transportation	271,903	1,563,342	1,414,435
Shipbuilding	46,185	298,899	390,598
Aircraft	7,753	39,579	34,101
Oil & gas drilling	30,185	241,040	333,850
Mining, quarrying, lumbering	26,356	146,110	127,878
Agricultural	74,971	552,423	705,036
Machinery, tools, etc.	364,785	2,234,110	2,308,746
Elec. Machinery, etc.	169,323	1,045,391	1,132,372
Appliances, etc.	156,269	1,002,812	1,018,582
Other domestic equipment	196,496	992,421	1,018,576
Containers	605,807	3,191,504	3,644,879
Ordnance, military	10,415	59,432	78,771
Nonclassified	182,378	949,046	482,688
Total domestic shipments	5,944,084	35,890,397	37,344,291
Exports	328,348	1,051,157	874,849
Total shipments	6,272,432	36,941,554	38,219,140

Data from American Iron & Steel Institute.

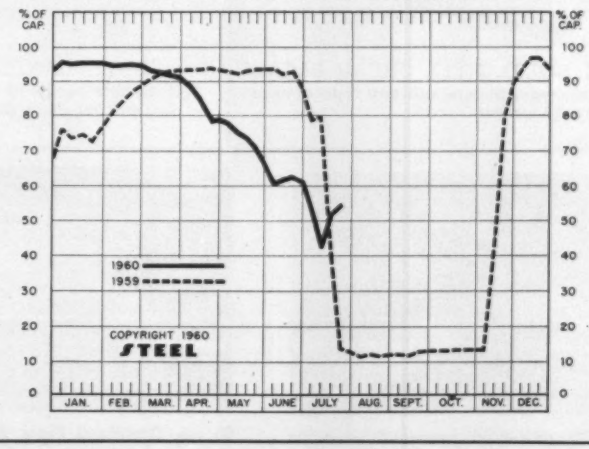
DISTRICT INGOT RATES

(Percentage of capacity utilized)

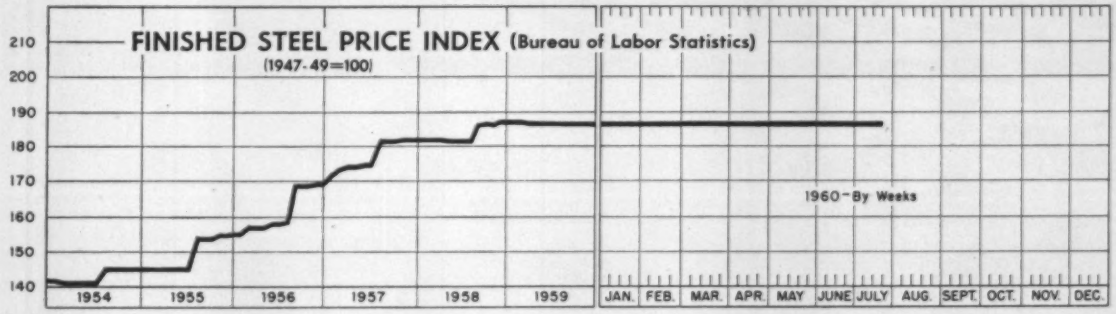
	Week Ended July 24	Week Ago	Month Ago	Year Ago
Northeastern	59	57	69	*
Buffalo	55	52	61	*
Pittsburgh	48	44	59	*
Youngstown	46	35	46	*
Cleveland	47	46	64	*
Detroit	85	82	80	*
Chicago	58	58	63	*
Cincinnati	45	43	54	*
St. Louis	50	52	68	*
Southern	65	65	63	*
Western	57	55	63	*
Total Industry	54.6	51.8	61.0	12.9
Index (1947-49=100)	96.9	91.9	108.3	22.7
Net Tons (In thousands)	1,556	1,476	1,739	365

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831331 in 1959. Source: American Iron & Steel Institute. *Not available due to general strike.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



July 19, 1960	Week Ago	Month Ago	June Index	Year Ago
186.2	186.2	186.6	186.6	187.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 19

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.773
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.493
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe, Line (100 ft)	195.433
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	195.398
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.414
		Woven Wire Fence (20-rod roll)	20.003

STEEL's FINISHED PRICE INDEX*

	July 20 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	207.63
Index in cents per lb	6.713	6.713	6.713	6.713	5.625

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$126.64
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	31.67	31.67	31.33	38.67	40.17

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	July 20 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.50
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.50
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.317
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.35-6.45
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.25
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

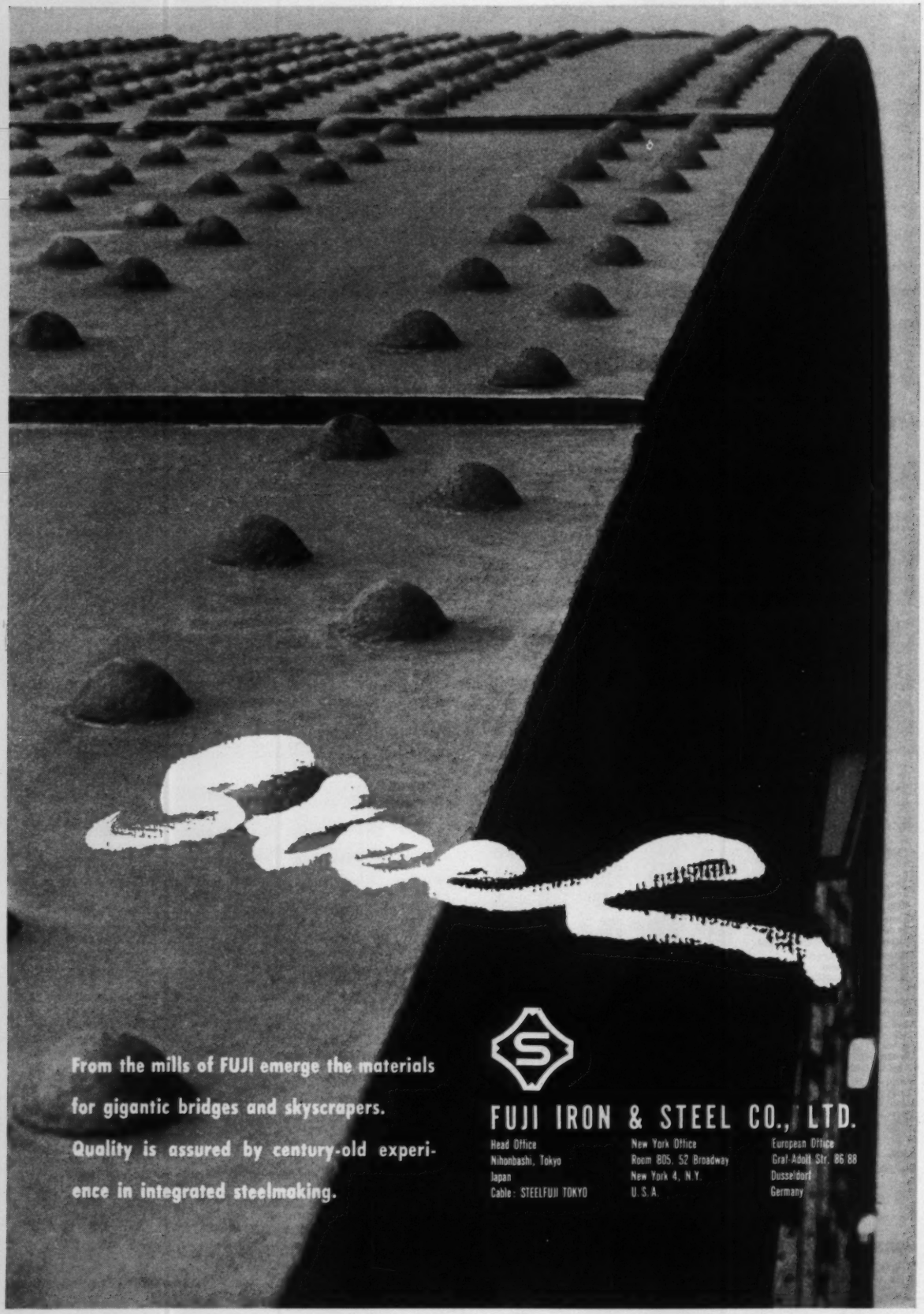
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 7/32-9/16" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton	July 20 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	58.16
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	59.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tonst	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$30.50	$30.50	$30.50	$39.50	$39.50
No. 1 Heavy Melt, E. Pa.	34.00	34.00	34.00	40.00	42.00
No. 1 Heavy Melt, Chicago	30.50	30.50	29.50	36.50	39.00
No. 1 Heavy Melt, Valley	33.50	32.50	32.50	41.50	40.50
No. 1 Heavy Melt, Cleve.	31.50	31.50	31.50	38.50	38.50
No. 1 Heavy Melt, Buffalo	29.50	29.50	30.50	33.50	34.50
Rails, Rerolling, Chicago	49.50	49.50	49.50	59.50	59.00
No. 1 Cast, Chicago	40.50	40.50	40.50	52.50	45.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25



From the mills of FUJI emerge the materials for gigantic bridges and skyscrapers. Quality is assured by century-old experience in integrated steelmaking.

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New York 4, N.Y.
U. S. A.

European Office
Graf-Adolf Str. 86/88
Dusseldorf
Germany

Steel Prices

Mill prices as reported to STEEL, July 20, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 160, footnotes, page 162.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14.....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa., U5 .....80.00
Owensboro,Ky. G8 .....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 ....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 .126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ....119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14..119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14 122.50
S.Duquesne,Pa. U5 ....122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Jonhstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburgh,Calif. C11 ...7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill. (1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill.U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ....6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ...6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ...5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ...5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 .....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 .....6.975
Lackawanna,N.Y. B2 ...6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ...5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded (including loaded extra) Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 .....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2 ..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. B5 .....9.025
Lackawanna,N.Y. B3 ...9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025

Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex. (26) T4 5.25
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ....5.675
Sterling Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ...7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa. (3) F5 ...5.575
Franklin,Pa. (4) F5 ..5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ...5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill. (8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell, Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts .Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ..6.975*
Ind.Harbor Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland,Ky. A10 ....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest, Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ...5.10
Allenport, Pa. P7 .....5.10
Alton, Ill. L1 .....5.30
Ashland, Ky. (8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer, Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken, Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....5.10
Ind. Harbor, Ind. I-2, Y1..5.10
Johnstown, Pa. (25) B2 ..5.10
Lackaw'na, N.Y. (25) B2..5.10
LosAngeles (25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa, Colo. C10 ....6.20
Riverdale, Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle (25) B3 .....6.10
Seattle N14 .....6.60
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. W14 .....5.10
S. SanFrancisco (25) B3..5.85
SparrowsPoint, Md. B2 ..5.10
Torrance, Calif. C11 ....5.85
Warren, O. R2 .....5.10
Weirton, W. Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 .....8.40
Farrell, Pa. S3 .....8.40
Gary, Ind. U5 .....8.40
Houston S5 .....8.65
Ind. Harbor, Ind. Y1 ....8.40
KansasCity, Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville, O. S3 .....8.40
Newport, Ky. A2 .....8.40
Sharon, Pa. A2, S3 ....8.40
S. Chicago, Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10 .....7.575
Bessemer, Ala. T2 ....7.575
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.575
Fairfield, Ala. T2 .....7.575
Farrell, Pa. S3 .....7.575
Gary, Ind. U5 .....7.575
Ind. Harbor, Ind. I-2, Y1 7.575
Lackawanna, N.Y. B2 ..7.575
LosAngeles (25) B3 ....8.325
Seattle (25) B3 .....8.575
Sharon, Pa. S3 .....7.575
S. Chicago, Ill. W14 ....7.575
S. SanFrancisco (25) B3 .8.325
SparrowsPoint, Md. B2 ..7.575
Warren, O. R2 .....7.575
Weirton, W. Va. W6 ....7.575
Youngstown U5, Y1 ..7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ....5.35
Warren, O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn, Mich. S3 ....7.425
Detroit D2, M1, P20 ...7.425
Dover, O. G6 .....7.425
Evanston, Ill. M22 ....7.525
Farrell, Pa. S3 .....7.425
Follansbee, W. Va. W10 .7.425
Fontana, Calif. K1 .....9.20
FranklinPark, Ill. T6 ..7.525
Ind. Harbor, Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport, Pa. E10 ..7.525
NewBedford, Mass. R10..7.875
NewBritain, Conn. S15 ..7.875
NewCastle, Pa. B4, M22..7.425
NewHaven, Conn. D2 ..7.875
NewKensington, Pa. A6..7.425
Pawtucket, R.I. R3, N8..7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale, Ill. A1 .....7.525
Rome, N.Y. (32) R6 ....7.425
Sharon, Pa. S3 .....7.425
Trenton, N.J. (31) R5 ..8.875
Warren, O. R2, T5 ....7.425
Worcester, Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Cleveland A7 .....15.55
Carnegie, Pa. S18 .....15.55
Dover, O. G6 .....15.55
Farrell, Pa. S3 .....15.55
FranklinPark, Ill. T6 ..15.55
Harrison, N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville, O. S3 .....15.55
Pawtucket, R.I. N8 ....15.90
Riverdale, Ill. A1 .....15.55
Sharon, Pa. S3 .....15.55
Worcester, Mass. A7 ..15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn, Mich. S3 ....10.80
Dover, O. G6 .....10.80
Farrell, Pa. S3 .....10.80
Ind. Harbor, Ind. Y1 ....10.80
Sharon, Pa. S3 .....10.80
Warren, O. R2 .....10.80
Weirton, W. Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	9.05	10.10	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, M23	8.95	10.10	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria, O. S1	...	...	19.05	22.15	....
FranklinPark, Ill. T6	...	...	19.20	23.30	28.15
Harrison, N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer, Mass. W12	...	...	18.85	....	....
Trenton, N.J. R5	...	...	18.85	22.95	27.80
Worcester, Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover, O. G6 .....7.425*
Evanston, Ill. M22 ....7.525*
McKeesport, Pa. E10 ..7.50*
NewCastle, Pa. M22 ..7.425*
Riverdale, Ill. A1 ....7.525*
Warren, O. B9, S3, T5..7.425*
Worcester, Mass. A7 ..7.975
Youngstown S41, Y1 .7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell, Pa. S3 .....7.50
Sharon, Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrel, Pa. S3 .....5.525
Riverdale, Ill. A1 .....5.675
Sharon, Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.85
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W. Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa, Pa. J5 (21-27 Ga.)	....	7.90	8.10
IndianaHarbor, Ind. Y1 (20-27 Ga.)		7.90	....
Niles, O. R2 (20-27 Ga.)	....	7.90	8.10

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Ind. Harbor Y1	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W. Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5	$8.20
Fairfield, Ala. T2	8.30
Fairless, Pa. U5	8.30
Fontana, Calif. K1	8.85
Gary, Ind. U5	8.20
GraniteCity, Ill. G4	8.30
Ind. Harbor, Ind. I-2, Y1	8.20
Irvin, Pa. U5	8.20
Niles, O. R2	8.20
Pittsburg, Calif. C11	8.85
SparrowsPoint, Md. B2	8.20
Weirton, W. Va. W6	8.20
Yorkville, O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa, Pa. J5	7.85
Gary, Ind. U5	7.85
GraniteCity, Ill. G4	7.95
Ind. Harbor, Ind. Y1	7.85
Irvin, Pa. U5	7.85
Yorkville, O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary, Ind. U5	$10.05
Irvin, Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W. Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift, Pa. U5	8.10
Mansfield O. E6	8.10
Warren, O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W. Va. W10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2 ..8.00
Aliquippa, Pa. J5 .....8.00
Alton, Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville, Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville, Ind. M8..8.10
Donora, Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield, Ala. T2 .....8.00
Fostoria, O. (24) S1 .....8.10
Houston S5 .....8.25
Jacksonville, Fla. M8 ...8.35
Johnstown, Pa. B2 .....8.00
Joliet, Ill. A7 .....8.00
KansasCity, Mo. S5 .....8.25
Kokomo, Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa, Colo. C10 ....8.25
Monessen, Pa. P7, P16..8.00
Palmer, Mass. W12 .....8.30
Pittsburg, Calif. C11 ....8.95
Portsmouth, O. P12 .....8.00
Rankin, Pa. A7 .....8.00
S. Chicago, Ill. R2 .....8.00
S. SanFrancisco C10 ....8.95
SparrowsPoint, Md. B2 ..8.10
Sterling, Ill. (1) N15 ....8.00
Sterling, Ill. N15 .....8.10
Struthers, O. Y1 .....8.00
Waukegan, Ill. A7 .....8.00
Worcester, Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria, O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora, Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown, Pa. B2 ....13.40
KansasCity, Mo. U3 ...12.90
Minnequa, Colo. C10 ..12.775
Monessen, Pa. P7, P16..12.65
Muncie, Ind. I-7 .....13.60
NewHaven, Conn. A7 ...12.95
Palmer, Mass. W12 ....13.70
Pittsburg, Calif. C11 ...13.45
Portsmouth, O. P12 ....12.65
Roebling, N. J. R5 ....12.95
SparrowsPt., Md. B2 ...13.50
Struthers, O. Y1 .....13.40
Trenton, N.J. A7 .....12.95
Waukegan, Ill. A7 .....12.65
Worcester, Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3..10.00
Kokomo, Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
NewHaven, Conn. A7 ...10.05
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 .....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.70
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Worcester, Mass. A7 ....10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Bartonville, Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria, O. S1 .....9.80
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3..10.00
LosAngeles B3 .....10.70
Millbury, Mass. (12) N6 .10.05
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16..9.75
Muncie, Ind. I-7 .....9.95
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.70
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Wor'ster, Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....16.50
Bartonville, Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ind. M8..16.40
Fostoria, O. S1 .....16.30
Houston S5 .....16.55
Jacksonville, Fla. M8 ..16.65
Johnstown, Pa. B2 .....16.30
KansasCity, Mo. S5 .....16.55
Kokomo, Ind. C16 .....16.30
Minnequa, Colo. C16 ....16.55
Monessen, Pa. P16 .....16.30
Muncie, Ind. I-7 .....16.50
Palmer, Mass. W12 .....16.60
S. SanFrancisco C10 ....17.15
Waukegan, Ill. A7 .....16.30
Worcester, Mass. A7, J6..16.60

ROPE WIRE (A)

Bartonville, Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria, O. S1 .....13.45
Johnstown, Pa. B2 .....13.45
KansasCity, Mo. U3 ....13.70
Monessen, Pa. P7 .....13.45
Muncie, Ind. I-7 .....13.65
Palmer, Mass. W12 ....13.75
Portsmouth, O. P12 ....13.45
Roebling, N.J. R5 .....13.75
St. Louis L8 .....13.45
SparrowsPt., Md. B2 ...13.55
Struthers, O. Y1 .....13.45
Worcester, Mass. J4 ....13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes — Col.

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES — Col.

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — Col.

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — Col.

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga. — Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)

	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80†‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (16 to 8 gage)

	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48) A11	9.00 9.75*
Bartonville(48) K4	9.85 19.90
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts. 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread. ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and s'otted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packages	43.75
Bulk	50

C A P AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packages	+ 5
Bulk	+19
Through 1 in. diam., longer than 6 in.:	
Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

stainless

because no other metal will do the job as well—

stronger
handsome
ever-bright
non-corrodible
easy to clean

thanks to

Superior

STAINLESS STRIP STEEL

Your fire extinguisher with the stainless body features a very good reason for being ever-ready for service: stainless steel is the *changeless* metal — good as new, year after year, without costly maintenance. • Made of SUPERIOR Stainless Strip Steel, the extinguisher body is easy to draw and weld—always uniform in behavior and performance because of uniformly Superior quality, coil after coil. Let us quote on your stainless requirements.

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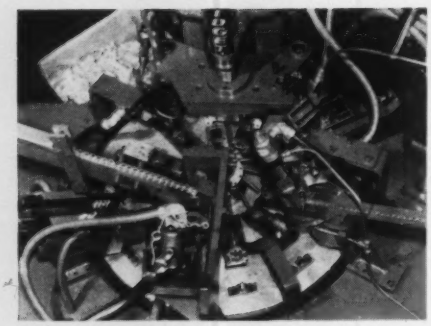
DENISON HydrOILics

- How a hardware maker assembles and inspects 2,700 complex pieces an hour.
- Another example of how a **M**ultipress **A**nalysis **P**rogram can help you **MAP** superior production methods.

ASSEMBLY



45 ASSEMBLIES-PER-MINUTE *produced on a one-ton Denison Multipress and automatic index table at Unique Balance Division, S. H. Pomeroy Co., Dubuque, Iowa.*

FOUR-PART *assembly is spring tension unit for sash balances.*

ASSEMBLY and inspection of these complex hardware units is ultra-fast and low-cost with this Denison hydraulic Multipress and feeding devices that boost production rates and trim costs.

Completely automatic, this particular operation assembles and inspects these four-part assemblies at a rate of 45-per-minute . . . *2,700-per-hour.* Any defective assemblies are automatically rejected. The operator has only to supervise the equipment and load component hoppers.

This automatic Multipress operation is typical of how multi-component assembly jobs are simplified with Denison hydraulic Multipress and simple tooling. Call in the Denison Production Specialist near you. He'll demonstrate how you can pinpoint savings with a no-cost **M**ultipress **A**nalysis **P**rogram that can **MAP** new ways to more efficient production in your plant.

DENISON ENGINEERING DIVISION
American Brake Shoe Co.
1242 Dublin Road • Columbus 16, Ohio

MODERN MACHINE TOOLS MMT=PE PRODUCTION EFFICIENCY

1960 Machine Tool Exposition
Denison Booth 914

DENISON
HYDRAULIC MULTIPRESS

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	30.00	42.25	44.50	40.00	40.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	63.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Sweepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	38.80	44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.595	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except; Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.27	8.66	10.06	....	8.28	8.95	11.80	16.38	9.53	8.84	10.43
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.80	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	10.81	11.22	11.34	....	12.29	10.97	12.68	....	11.38	11.17	12.18
Chicago	7.32	10.20	10.95	52.00	8.34	7.95	10.65	15.95	7.91	7.51	10.13
Cincinnati	8.74	10.26	10.20	65.30	11.06	8.87	11.53	16.27	9.47	8.79	11.01
Cleveland	7.32	9.88	11.14	56.18	8.46	8.16	11.25	16.06	8.30	7.75	10.37
Dallas	9.62	10.05	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.60
Detroit	9.00	10.46	11.30	52.00	10.77	9.15	11.01	16.23	9.89	9.04	10.72
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.01	10.64	10.59	....	11.18	8.99	11.09	16.39	9.35	8.85	11.12
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.59	11.29	12.20	61.27	11.29	9.67	14.20	17.35	10.54	9.82	11.79
Memphis, Tenn.	9.84	10.05	....	....	11.24	9.92	12.74	....	10.33	10.12	11.41
Milwaukee	8.88	10.34	11.09	....	10.54	8.98	10.89	16.09	9.55	8.81	10.60
Moline, Ill.	9.24	10.70	11.45	....	10.90	9.34	11.15	16.45	9.83	9.17	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.85	9.60	10.66	52.71	10.85	9.25	11.95	16.38	9.45	9.20	10.45
Pittsburgh	7.32	9.88	11.03	52.00	8.44	7.95	11.25	15.95	7.91	7.51	10.13
Portland, Oreg.	10.20	12.05	12.35	....	12.20	10.20	16.65	17.80	10.80	10.35	12.50
St. Louis	8.77	10.58	10.53	....	10.50	8.77	11.28	16.33	9.14	8.62	10.57
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.45	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.07	11.44	12.05	54.02	11.84	9.96	16.20	17.80	10.59	10.17	12.46
Spokane, Wash.	9.92	11.29	11.90	54.02	11.69	9.81	16.20	17.80	10.44	10.02	12.31

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. x 36 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅝ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 72-75%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5%, f.o.b. vessel Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	*$19.75-20.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon, Forging Quality (net ton)	$97.00
Alloy (net ton)	115.00
Wire Rods:	
Carbon 5/16" to under ¼ in.	5.30
Carbon, ¼ in. to 47/64 in.	5.70
Alloy	6.40
Wire (Carload lots)	8.40
Bars & Small Shapes:	
Carbon, merchant quality	5.40
Carbon, special quality	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Structural Size Angles & Zees	5.40
Plates:	
Carbon	5.45
Sheets & Coils, Hot Rolled:	
Carbon Sheets	5.00
Carbon Strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon Sheets	6.35
Carbon Strip (0.080 and lighter)	6.35
Carbon Strip (0.081 and heavier)	6.65
Sheets & Coils, Galvanized:	
Standard Quality	6.70
Culvert Quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field Grade	9.00
Armature Grade	9.50
Electrical Grade	10.15
Tin Mill Products (Per Base Box; 100 lb basis wt)	
Coke Tin Plate (1.25 lb pot yield)	$10.60
Electrolytic Tin Plate (0.25 lb coating)	9.10
Black Plate	8.30
Nails, c.l. lots (per keg)	
400 keg min.	$8.15

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l. 39.80; ton lots 41.80	
Brass, 80/20, leaded (60 mesh)	*39.90*
Bronze, filter powder, 90/10	47.00*
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	$1.00
Nickel	$0.95-$1.15
Nickel-Silver	61.70
Solder	15.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	25.90
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars nom.**
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.75	$5.65	$5.65	$5.50	$5.85
Bar Size Angles	5.85	5.75	5.75	5.60	5.95
Structural Angles	5.85	5.55	5.55	5.40	5.75
I-Beams	5.60	5.50	5.50	5.35	5.70
Channels	5.60	5.50	5.50	5.35	5.70
Plates (basic bessemer)	6.00	5.90	5.90	5.75	6.10
Sheets, H.R.	*Nom.*	*Nom.*	*Nom.*	*Nom.*	*Nom.*
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	*Nom.*	*Nom.*	*Nom.*	*Nom.*	*Nom.*
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	*Nom.*	*Nom.*	*Nom.*	*Nom.*	*Nom.*
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	*25.70*	*25.14*	*24.85*	*24.95*	*26.02*
Barbed Wire (†)	6.25	6.15	6.15	6.00	6.35
Merchant Bars	5.85	5.75	5.75	5.60	5.95
Hot-Rolled Bands	6.20	6.10	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	6.35	6.20	6.20	6.60
Wire Rods, O. H., No. 5	6.55	6.50	6.35	6.35	6.70
Bright Common Wire Nails (‡)	*7.50*	*7.40*	*7.40*	*7.00*	*7.60*

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton. Palmerton, Pa. 21-23% Mn, $102.50, 19-21% Mn, 1-2% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va., Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 98% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c.

Blocking Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c; No. 2 (Cr 58-63%, C 5-6%, Si 8-10%), 23.00c; No. 3 (Cr 58-63%, C 5-6%, Si 10-12%), 23.00c.

Refined Charge Chrome: No. 1 (Cr 50-55%, C 5% max, Si 2% max), 25.00c; No. 2 (Cr 56-60% C 5% max, Si 2% max), 25.00c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 31.50c per lb contained Cr; 0.010% max, 32.50c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 34.50c; 0.05% max, 33.50c; 0.10% max, 33.25c; 0.20% max, 33.00c; 0.50% max, 32.75c; 1.0% max, 32.50c; 1.5% max, 32.25c; 2.0% max, 32.00c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down, 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, cariot, packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carboram: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Sigio, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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Exports Bolster Scrap Market

Continued heavy buying of steelmaking grades for overseas shipments counteracts the effects of slow demand from domestic mills. STEEL's composite is unchanged at $31.67

Scrap Prices, Page 172

• **Philadelphia**—Heavy export buying features the scrap market here, helping to sustain directly the prices on such items as No. 1 and No. 2 heavy melting and No. 1 and No. 2 bundles, indirectly those of most other steel grades. Domestic demand remains slack.

Rail crops, 2 ft and under, are off $1 a ton to $53-$54, delivered.

• **New York**—Scrap prices remain unchanged. Good export demand is providing adequate strength in the steel grades in the absence of important domestic buying. But the general price tone is easy, including the market on cast iron and stainless steel specialties, as well as the major steel tonnage items.

• **Chicago**—The scrap market here is quiet. Demand for dealer scrap is negligible, and buying doesn't provide a test of current quotations.

An upturn in steelmaking is not expected in July and some doubt if a substantial gain will be registered in August. The steelmaking rate here is about 58 per cent of capacity.

Foundry scrap is also listless in face of slow demand for castings and vacation closing of gray iron shops.

• **Pittsburgh** — It's the consensus that prices of most grades have hit bottom, but there's no expectation of a sustained upward movement for at least a month. Apart from the release of some old orders by a major consumer, little scrap is moving. There will probably be little need for additional tonnage until operations reach 80 per cent of capacity. In stainless grades, the upturn may be two or three months away. Mill inventories of 18-8 solids are increasing even though no open market purchases are being made. Stocks of home scrap are accumulating.

• **Cleveland**—A small sale of No. 1 busheling for shipment to the Valley tended to firm the market here. Because little material is moving, dealers' yards are well stocked with all grades. However, they are not exerting any appreciable downward pressure on the price structure and would be quickly absorbed on a renewal of buying by the mills.

• **Youngstown**—Expected July buying of scrap has been deferred along with automobile orders. No substantial demand is in sight. The last order (over a week ago) was for No. 1 heavy melting industrial at $34. A major steel firm here was the buyer.

• **Detroit**—No marked change has developed in the scrap market here. Brokers and dealers feel that slow

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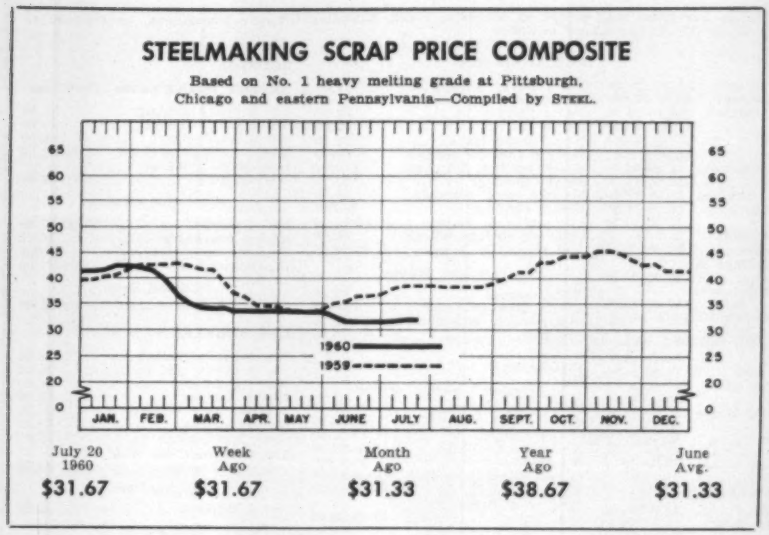

mill activity is balancing out the small scrap generation from automotive plants. With the exception of a few small orders, there is no action. Prices appear to have leveled off and are expected to start rising slowly as the auto industry gears up for new model production.

• **Buffalo**—Scrap dealers have pretty well completed shipments on their July mill orders and are requesting mills for additional tonnages for delivery this month. However, mills are not reaching for scrap and may wait until early August before placing new orders.

The price of No. 2 heavy melting steel has been reduced $1 a ton to a range of $24 to $25, reflecting the drop in the No. 2 bundles price. However, the price for No. 2 heavy is strictly nominal because of absence of new business. Low phos scrap has also been cut another dollar a ton.

The cast scrap market is soft, and dealers anticipate a drop of a dollar or so on new orders.

• **Cincinnati**—The scrap market is resting on dead center. Speculative buying by brokers is helping establish a firm price outlook in view of the lack of consumer interest. At current prices, yard intake has fallen sharply.

• **St. Louis**—There is little movement of scrap to mills and not much coming into yards. Scrap truckers have gone into other work.

Mills still have large inventories and engage in only selective buying. Millmen have become bargain hunters.

• **Houston**—Scrap activity is dull, although exports have helped the situation some. Export prices are quoted $35 to $36 for No. 1 heavy melting, delivered to the dock, and $32 for No. 2. These prices are well above the domestic market. Foundry inventories are high and need is low. Dealers hope for a pickup in the months ahead, but concede there is no strong foundation for optimism.

• **San Francisco**—No. 1 cupola cast is up $2 a ton. Otherwise, the iron and steel scrap market here is steady, a position it has been in for a couple of months.

• **Seattle**—Conditions in the scrap market are unchanged. Dealers are gratified that prices have held during the midseason doldrums because a drop had been expected. There is little activity, the larger consumers being well stocked. Export interest has been the dominant strength in recent weeks. Continued offshore demand and resumption of mill buying are factors that indicate improvement in the near future.

• **Los Angeles**—Sales are off 5 per cent from May's. The domestic market is dull, and supplies are ample.

Coke . . .

Metallurgical Coke Prices, Page 167

Production of coke in May totaled 5,350,095 net tons (5,271,154 oven, 78,941 beehive), reports the U. S. Bureau of Mines. Output in April was 5,755,993 tons (5,653,858 oven, 102,135 beehive), and in May, 1959, it was 6,387,317 tons (6,243,859 oven, 143,458 beehive).

Output in the first five months this year amounted to 29,828,344 tons (29,267,307 oven, 561,037 beehive) compared with 30,169,548 tons (29,549,467 oven, 620,081 beehive) in the like period of 1959.

Producers' stocks of oven coke at the end of May amounted to 3,783,199 net tons, equal to 22.2 days' production. That compares with 3,154,278 tons, equal to 16.1 days' production at the end of May last year.

Pig Iron . . .

Pig Iron Prices, Page 166

Despite vacations and hot weather, foundries are consuming a little more iron this month than had been expected. However, the industry is far from active.

Suppliers are plentiful, even along the Eastern Seaboard where not a single merchant furnace is in operation. Producers of iron continue to curtail operations in an effort to reduce inventories. These are a few:

Hanna Furnace Corp. has shut down another blast furnace at Buffalo and is operating only one of its four stacks at that point. The curtailment came despite the fact that this is the middle of the Great Lakes shipping season when demand for iron from Midwest foundries is usually at a good level. The curtailment is surprising also in view of Mystic pulling out of the merchant iron market in New England and the shutdown of the Republic Steel blast furnace at Troy, N. Y. Observers had expected that good New England demand would help sustain operations in Buffalo.

Woodward Iron Co., Woodward, Ala., plans to bank a blast furnace this week. The firm has been operating two of four blast furnaces.

New Jersey Zinc Co. is suspending operations at its spiegeleisen furnace at Palmerton, Pa., around the end of this month.

(*Please turn to Page* 177)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, July 20, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 20	$31.67
July 13	31.67
June Avg.	31.33
July 1959	38.45
July 1955	39.67

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	30.00-31.00
No. 1 factory bundles	35.00-36.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	18.00-19.00
Cast iron borings	17.00-18.00
Cut structurals:	
2 ft and under	*36.00-37.00*
3 ft and under	*35.00-36.00*
Heavy turnings	27.00-28.00
Punchings & plate scrap	*38.00-39.00*
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	34.00-35.00
Unstripped motor blocks	25.00-26.00
Clean auto cast	37.00-38.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	46.00-47.00
Angles, splice bars	45.00-46.00
Railroad specialties	50.00-51.00
Rails, rerolling	51.00-52.00

Stainless Steel Scrap

18-8 bundles & solids	*175.00-180.00*
18-8 turnings	*95.00-100.00*
430 bundles & solids	*90.00-95.00*
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	31.00-32.00
No. 1 hvy melt., dealer	29.00-30.00
No. 2 hvy melting	27.00-28.00
No. 1 factory bundles	35.00-36.00
No. 1 dealer bundles	30.00-31.00
No. 2 bundles	19.00-20.00
No. 1 busheling, indus.	31.00-32.00
No. 1 busheling, dealer	29.00-30.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	15.00-16.00
Shovel turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut structurals, 3 ft	33.00-34.00
Punchings & plate scrap	35.00-36.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	34.00-35.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	45.00-46.00
Drop broken machinery	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
R.R. malleable	44.00-45.00
Rails, 2 ft and under	*47.00-48.00*
Rails, 18 in. and under	*48.00-49.00*
Angles, splice bars	*41.00-42.00*
Axles	49.00-50.00
Rails, rerolling	49.00-50.00

Stainless Steel Scrap

18-8 bundles, solids	*175.00-180.00*
18-8 turnings	*95.00-100.00*
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	14.00-15.00
No. 1 bundles	28.00-29.00
No. 2 bundles	12.50-13.50
No. 1 busheling	24.00-25.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	30.00-31.00
Heavy breakable	30.00-31.00
Unstripped motor blocks	22.00-23.00
Charging box cast	30.00-31.00
Clean auto cast	43.00-44.00

CLEVELAND

No. 1 heavy melting	31.00-32.00†
No. 2 heavy melting	23.00-24.00†
No. 1 factory bundles	32.00-33.00
No. 1 bundles	31.00-32.00†
No. 2 bundles	17.00-18.00†
No. 1 busheling	31.00-32.00†
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	32.00-33.00
Cut structurals, plate 2 ft and under	39.00-40.00
Low phos. punchings & plate	31.00-32.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	33.00-34.00†

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Brake shoes	35.00-36.00
Clean auto cast	50.00-51.00
Burnt cast	40.00-41.00
Drop broken machinery	50.00-51.00

Railroad Scrap

R.R. malleable	48.00-49.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Rails, random length	44.00-45.00
Cast steel	38.00-39.00
No. 1 railroad cast	46.00-47.00
Railroad specialties	43.00-44.00
Angles, splice bars	45.00-46.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	175.00-180.00
18-8 turnings	75.00-80.00
430 clips, bundles, solids	90.00-95.00
430 turnings	20.00-30.00

YOUNGSTOWN

No. 1 heavy melting	*33.00-34.00†*
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	33.00-34.00
No. 1 bundles	33.00-34.00†
No. 2 bundles	20.00-21.00†
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	35.00-36.00
Electric furnace bundles	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

BUFFALO

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	*24.00-25.00†*
No. 1 bundles	29.00-30.00
No. 2 bundles	21.00-22.00
No. 1 busheling	29.00-30.00
Shovel turnings	17.00-18.00
Machine shop turnings	12.00-13.00
Cast iron borings	15.00-16.00
Low phos. structurals and plate, 2 ft and under	*39.00-40.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-43.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	43.00-44.00
Rails, 3 ft and under	49.00-50.00
Railroad specialties	40.00-41.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.50-27.50
No. 2 heavy melting	22.50-23.50
No. 1 bundles	26.50-27.50
No. 2 bundles	17.50-18.50
No. 1 busheling	26.50-27.50
Machine shop turnings	10.00-11.00
Mixed borings, turnings	10.00-11.00
Shovel turnings	12.00-13.00
Cast iron borings	12.00-13.00
Low phos. 18 in.	34.00-35.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable cast	31.00-32.00
Charging box cast	36.00-37.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
Rails, 18 in. and under	51.00-52.00
Rails, random lengths	43.00-44.00

PHILADELPHIA

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	36.00
No. 2 bundles	20.00
No. 1 busheling	36.00
Electric furnace bundles	37.00
Mixed borings, turnings	17.00†
Shovel turnings	21.00
Machine shop turnings	15.00
Heavy turnings	28.00†
Structurals & plates	38.00-40.00
Couplers, springs, wheels	40.00
Rail crop, 2 ft & under	*53.00-54.00*

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	38.00
Drop broken machinery	50.00
Malleable	46.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	7.00-8.00†
Mixed borings, turnings	8.00-9.00†
Shovel turnings	9.00-10.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	30.00-31.00

Stainless Steel

18-8 sheets, clips solids	165.00-170.00
18-8 borings, turnings	80.00-85.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	24.00-24.50
No. 2 heavy melting	19.00-20.00
No. 1 bundles	24.00-24.50
No. 1 busheling	24.00-24.50
Machine shop turnings	6.00-7.00
Shovel turnings	*8.00-8.50*
No. 1 cast	39.00-40.00
Mixed cupola cast	*38.00-39.00*
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	28.00-29.00
No. 2 bundles	16.00-17.00
No. 1 busheling	31.00-32.00
Cast iron borings	9.00-10.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	35.00-36.00
structurals & plate	35.00-36.00
Electric furnace bundles	32.00-33.00
Electric furnace:	
3 ft and under	31 00-32.00
2 ft and under	32.00-33.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	46.00-47.00
Unstripped motor blocks	36.00-37.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	28.00-29.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	40.00-41.00
Angles, splice bars	39.00-40.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00†
No. 2 heavy melting	28.00†
No. 1 bundles	33.00†
No. 2 bundles	19.00†
No. 1 busheling	33.00†
Machine shop turnings	9.00†
Shovel turnings	11.00†

Cast Iron Grades

No. 1 cupola	44.00†
Charging box cast	37.00†
Heavy breakable cast	35.00†
Unstripped motor blocks	36.00
Clean auto cast	45.00†
Stove plate	*35.00*

Railroad Scrap

No. 1 R.R. heavy melt.	31.00†
Rails, random lengths	38.00†
Rails, rerolling	48.00
Rails, 18 in. and under	41.00†
Angles, splice bars	41.00†

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 2 bundles	18.00
Machine shop turnings	11.00-12.00
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	33.00-35.00
Heavy breakable	26.00
Foundry malleable	31.00†
Unstripped motor blocks	29.00-31.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00
No. 2 bundles	17.00
Machine shop turnings	*15.00*
Shovel turnings	15.00
Cast iron borings	15.00
Cut structurals and plate 1 ft and under	*43.00*

Cast Iron Grades

No. 1 cupola	*42.00*

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-34.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	35.00-38.00
No. 2 heavy melting	32.00-35.00
No. 2 bundles	20.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	33.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SEATTLE

Prepared, f.o.b. car)

No. 1 heavy melting	38.50
No. 1 hvy (unprepared)	33.00
No. 2 heavy melting	35.50
No. 2 hvy (unprepared)	30.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	34.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	*43.00*
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	25.80
No. 2 hvy. melt, 2 ft & under	25.50
No. 1 bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	25.50
Unprepared	20.45
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	43.00

†Nominal.
‡F.o.b. Hamilton, Ont.

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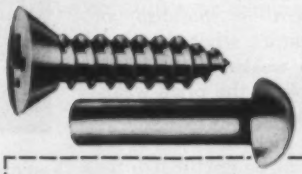

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Copper Upturn to Start in August

Nonferrous Metal Prices, Pages 176 & 177

U. S. COPPER sales will hit their low point of the year this month. At least, that's the fervent prayer of the industry.

July normally is the slowest month as brass mills and other large consumers shut down for summer vacations. Business should strengthen in August when shipments are forecast at about the June level of 106,207 tons, still not up to where coppermen would like them.

The longer range outlook is cloudy, coppermen frankly admit. Consensus: It's still too early to predict the fourth quarter, or even September. Yet, hopes are high that the last three months will be the best of the year.

Actually, first half business wasn't bad. Copper Institute figures show U. S. deliveries to fabricators totaled 685,592 tons. If second half sales would match that mark, the yearly total would be 1.37 million tons, the best showing since 1956.

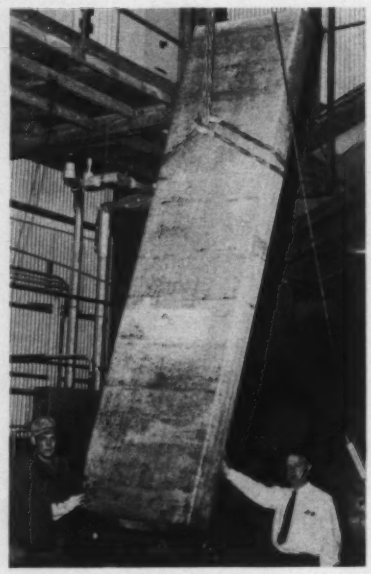
• **Misleading**—Unfortunately, statistics don't tell the whole story. The truth is: Domestic demand has been only fair (in some cases poor) since April. Even more significant: Some of the shipments merely represent a buildup of stocks by fabricators, whose business has been much weaker than anticipated. Just look at the price weakness in fabricated products.

What muscle there has been in the market lately can be credited to the high level of demand from overseas.

There's plenty of zip in production, though. U. S. refined output in June soared to 161,073 tons, a record. Domestic producer stocks climbed to 87,667 tons while Free World stocks hit a whopping 340,072 tons.

• **Mixed Blessing** — Rising stocks mean more production than demand. And that is copper's blessing and curse. Excess productive capacity is needed to expand markets, but uninterrupted overproduction gluts the market and depresses prices.

A heavy overabundance of copper in 1960 has been predicted since late last year, some estimates pegging the imbalance as high as 10 to 12 per cent. Now, it looks like the market will get some respite through the chaotic conditions in the Belgian Congo that have shut off production at the 319,000 ton a year properties in Katanga Province.



18,000 LB INGOT keynotes drive to develop a big, new market for Hydro-T-Metal, a zinc-copper-titanium alloy. The object: Wider sheets. Measuring 15 ft long by 41 in. wide by 10 in. thick, the huge ingots are produced by American Zinc, Lead & Smelting Co., St. Louis, for Hydrometals Inc., New York. They will be rolled on a toll basis by Dow Metal Products Co. (division of Dow Chemical Co.) at its Madison, Ill., plant. Reports indicate that good acceptance in such building products as gutters, downspouts, and flashings should push sales of Hydro-T-Metal to 32 million lb this year

Union Miniere du Haut Katanga, operator of the rich mines, says full scale output will be resumed this week—a view not shared by all informed metalmen. Temporarily, things do appear to be under control, with the province seceding from the rest of the Congo and Belgian paratroopers guarding the mine areas. Yet, with seething discontent and rampant tribalism loose throughout the Congo, it may be months before conditions settle down.

The world market has reacted: Higher prices are quoted in Europe and the wobbly U. S. custom smelter quotation has firmed.

• **What's Ahead** — The primary price isn't in jeopardy and the custom smelter price doesn't look like it will move over the next few weeks. In September, another production crisis will have to be faced. That's when the labor contract expires at the world's largest copper deposit, Anaconda Co.'s giant Chuquicamata mine in Chile which last year produced 307,000 tons of copper. When a contract expires in Chile, there's always a fair chance for a strike—the odds may be even greater this year. If Chuquicamata does go out, prices will firm but probably not rise. Throughout the year, plenty of copper will be available for immediate delivery.

Weakness on Coast

Another indication that nonferrous sales have fallen well below forecasts came late last week when Kaiser Aluminum & Chemical Corp. shut down a 22,000 ton a year potline at its Mead, Wash., aluminum reduction plant. Announced reason: "To adjust plant inventories." The Mead Works supplies West Coast markets. Only five of eight potlines remain in operation. Kaiser is now operating its primary facilities at 82 per cent of capacity, or at an annual rate of 502,500 tons.

YOU CAN FIND BOTH THE BIGGEST AND THE BEST AT YOUR COMMERCIAL HEAT TREATER

1

2

3

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2 *A Vacuum Heat Treating Furnace for special materials.*

3 *Large capacity vertical furnace for heat treating large parts.*

The three furnaces shown on this page are units of the facilities of commercial heat treating plants in three different sections of the country.

Today, with the ever growing demand for *better* heat treating, economical volume equipment of this sort is becoming essential and the commercial heat treater has been alert to industry's requirements.

Quality work and versatility are the keynotes of this industry's objectives when treating the thousands of vital, intricate, and costly components of important products.

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Houston 11, Texas

The Dayton Forging & Heat Treating Co.
Dayton 3, Ohio

Dominy Heat Treating Corp.
Dallas, Texas

Fred Heinzelman & Sons, Inc.
New York 12, New York

Alfred Heller Heat Treating Co.
New York 38, New York

Ipsenlab of Rockford, Inc.
Rockford, Illinois

Ipsenlab of Canada Ltd.
Toronto, Ontario

L-R Heat Treating Co.
Newark, New Jersey

Metallurgical, Inc.
Minneapolis 14, Minnesota

Metallurgical, Inc.
Kansas City 8, Missouri

Owego Heat Treat, Inc.
Apalachin, New York

Paulo Products Company
St. Louis 10, Missouri

Pittsburgh Commercial Heat Treating Co.
Pittsburgh 1, Pennsylvania

The Queen City Steel Treating Co.
Cincinnati 25, Ohio

J. W. Rex Company
Lansdale, Pennsylvania

Stanley P. Rockwell Company
Hartford 12, Connecticut

Scott Ford, Inc.
Rock Island, Illinois

Syracuse Heat Treating Corp.
Syracuse, New York

Temperature Processing Co.
North Arlington, New Jersey

United Heat Treating Co.
Fort Worth 7, Texas

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment data, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb f.o.b. Minneapolis; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $210-212 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $45-50 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 104.375; prompt, 104.25.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.35-4.50.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.35; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.25-28.00; No. 12 foundry alloy (No. 2 grade), 23.75-24.25; 5% silicon alloy, 0.60 Cu max., 25.00-25.25; 13 alloy, 0.60 Cu max., 25.00-25.25; 195 alloy, 26.75-27.75; 108 alloy, 24.25-24.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.00; grade 2, 23.75; grade 3, 22.75; grade 4, 22.25.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft

Diam. (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 20.00-20.50; light copper, 18.00-18.50; No. 1 composition red brass, 17.00-17.25; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 30.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.00b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	26.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.50-15.75; new brass clippings, 14.00-14.50; light brass, 10.50-10.75; heavy yellow brass, 11.50-11.75; new brass rod ends, 12.50-12.75; auto radiators, unsweated, 12.50-12.75; cocks and faucets, 13.50-14.00; brass pipe, 14.00-14.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 4.00-4.50; new diecast scrap, 4.00-4.50; old diecast scrap, 2.00-2.25.

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 6.50-7.00; segregated low copper clips, 14.00-14.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.50-12.00; clean borings and turnings, 8.00-8.50; segregated low copper clips, 16.00-16.50; segregated high copper clips, 14.50-15.00; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00-11.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.75-15.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.25; No. 2 heavy copper and wire, 25.50; light copper, 22.00; refinery brass (60% copper) dry copper content, 23.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.25; No. 2 heavy copper and wire, 25.50; light copper, 22.00; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 16.00; yellow brass turnings, 14.50; radiators, 17.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 46.50, 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.
Nickel: Depolarized, less than 1000 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 122.50; 200-499 lb, 121.00; 500-999 lb, 120.50; 1000 lb or more, 120.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 80.60; 100-600 lb, 71.20; 700-1900 lb, 68.40; 2000-9900 lb, 66.60; 10,000 lb or more, 65.20.

Stannous Chloride (Anhydrous): 25 lb, 156.20; 100 lb, 151.40; 400 lb, 148.90; 800-19,900 lb, 108.00; 20,000 lb or more, 102.00.

Stannous Sulphate: Less than 50 lb, 141.30; 50 lb, 111.30; 100-1900 lb, 109.30; 2000 lb or more, 107.30.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 171*)

Commenting on foreign competition, Harleston R. Wood, president, Alan Wood Steel Co., Conshohocken, Pa., recently said there is a tremendous amount of European pig iron available on the East Coast at low prices.

Fall Upswing in Steel, Predicted by Wood

Harleston R. Wood, president, Alan Wood Steel Co., Conshohocken, Pa., thinks his company's steel production rate will dip to about 50 per cent of capacity this month then recover to about 84 per cent by October. The company's shipping rate in June was equal to its production rate at 60 per cent.

His production estimates for the rest of this year are based on forecasted orders, though there "is no appreciable amount of order backlog." However, customer inventory adjustments are well along.

Alan Wood's two year, $36 million expansion program is on schedule. The company plans to spend $20 million in 1960, the remainder next year. The present rate of material deliveries, though, is faster than had been anticipated and may result in upping expenditures this year. A blooming mill and plate mills are under construction.

Iron Ore . . .

Iron Ore Prices, Page 167

Additional vessels have been withdrawn from the ore trade on the Great Lakes due to the drop in steelmaking operations. As of July 15, only 183 ore carriers (78.88 per cent of the fleet) were operating compared with 215 (92.67 per cent) a month earlier, reports M. A. Hanna Co., Cleveland. Trip capacity of those vessels in commission on July 15 was 2,420,700 tons (83.37 per cent of the total fleet's capacity) compared with 2,759,485 tons (95.03 per cent) as of June 15, 1960.

Tubular Goods . . .

Tubular Goods Prices, Page 165

Demand for mechanical tubing held firm through May, then weakened. Last month, producers watched their operations dip to 50 per cent of capacity. This month, several firms are shut down entirely for vacations.

Although business is slow, the low point has apparently been passed. Orders from automotive suppliers are on the upswing as car manufacturers stage last minute cleanups of 1960 models. Buyers who normally want delivery in four to six weeks are calling for three week service, indicating that their stocks are abnormally low. Orders for direct shipment to the automakers are starting to trickle in, with first releases slated for mid-August. "We'll have a good third quarter and a whale of a fourth," a tubemaker predicts.

Pickup in demand for standard pipe has been encouraging. With construction activity at a seasonal peak, distributors who once complained about being overstocked are coming back into the market.

Oil country goods remain depressed. Figures from Hughes Tool Co., Houston, show 1854 rotary rigs in operation in the U. S. and Canada during the week ended July 16. This was a drop of eight from the number in operation the previous week.

Foreign pipe continues to undermine the domestic market, especially in the South, Southwest, and Southeast. Imported pipe is available in Pacific Coast markets at $30 to $50 a ton under the domestic offerings.

CLASSIFIED

Help Wanted

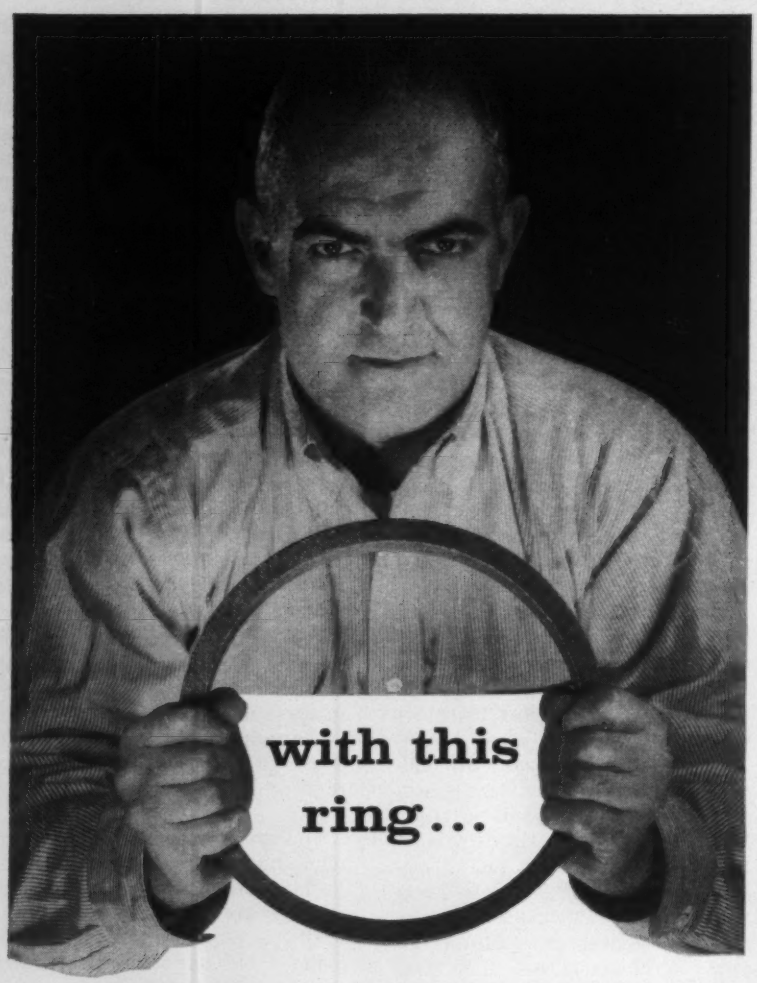
Established West Coast firm wants general superintendent with adequate experience in all phases of bar mill operations including operation of electric furnace. Submit full resume, salary expected to Box 860, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

PLANT MANAGER—16 years experience in Plant Management, Production Control, Accounting Problems, Manufacturing Development, etc. Small manufacturing plant preferred. Married, family. Write Box 861, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Position Wanted" set solid, 50 words or less $18.00, each additional word .36; all capitals, 50 words or less $21.00, each additional word .45; all capitals leaded, 50 words or less $25.00, each additional word .55. "Position Wanted" set solid, 25 words or less $5.00, each additional word .20; all capitals, 25 words or less $6.50, each additional word .26; all capitals leaded 25 words or less $8.00, each additional word .32. Keyed address takes seven words. Cash with order necessary on "Position Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.



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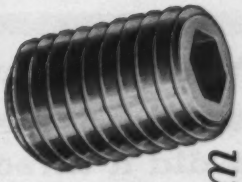

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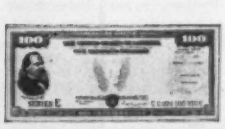

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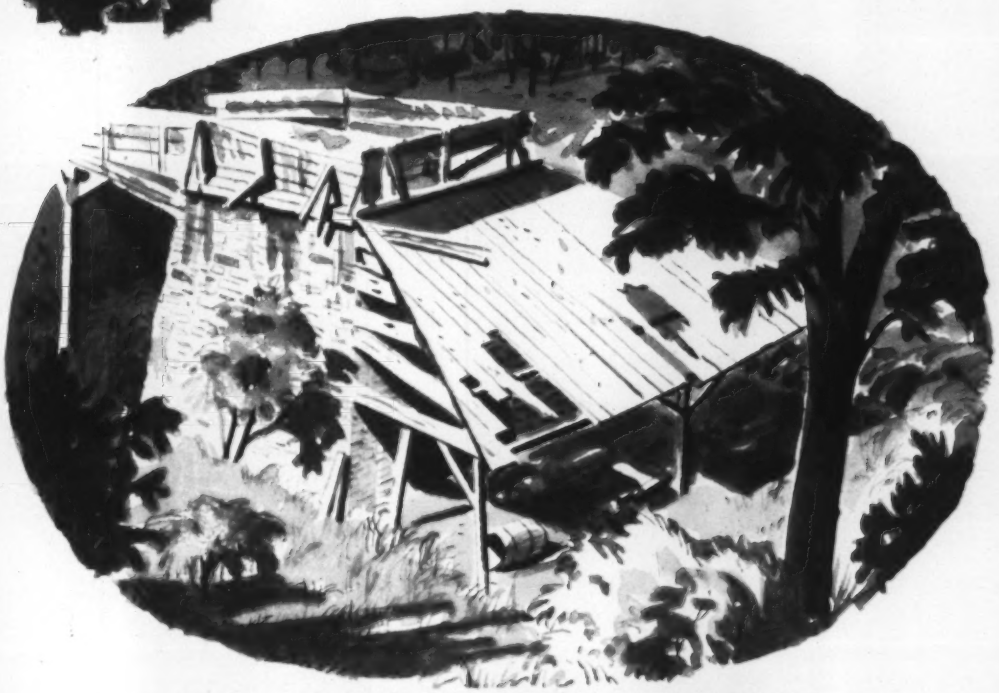
AMERICAN ORIGINALS IN IRON AND STEEL



22 YEARS DOWN-TIME!

There was a span of 22 years between the time the first American blast furnace was completed, until the time the first ton of iron was commercially produced.

In 1620 John Berkeley and a group of followers left England to build the first ironworks in America at Falling Creek, Virginia. As Berkeley and his crew cleared the land, erected houses and began constructing the furnace, the ever-present, suspicious Indians watched in the background.

Just as the blast furnace was to begin operation on March 22, 1622, the Indians attacked the ironworks and surrounding settlement. During the ensuing massacre, the Indians killed all but one of the 384 colonists and completely destroyed the furnace. Twenty two years passed before the first successful production of iron began, this time in Massachusetts.

It was not until many years later, after long usage of raw and calcined dolomite for fettling basic open hearth furnaces, that The J. E. Baker Company developed Magdolite, the original dead-burned dolomite. Since its inception, however, this superior product has offered producers lower refractory costs, increased furnace efficiency and more uniform ingots. The next time you buy, remember to specify Baker's Magdolite or Jebcolite. They are always 5 ways better . . . in composition, preparation, strength, economy and quality.

ANOTHER AMERICAN ORIGINAL

JEBCO
PRODUCTS
SINCE 1889

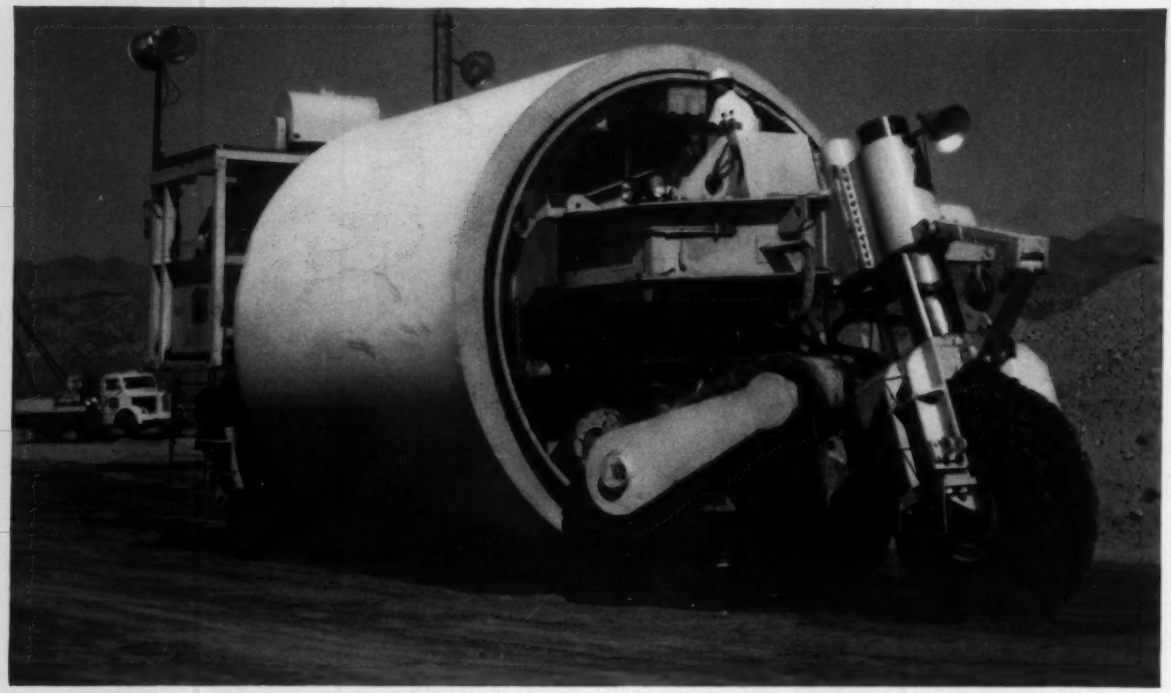
BAKER'S MAGDOLITE
The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

80-ton machine rolls into pipe to win contract—

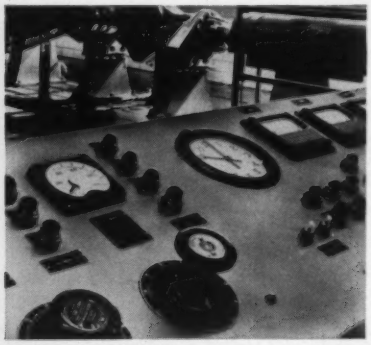
its Timken® bearings carry 12½ tons each



When American Pipe & Construction Company bid on siphons for the Metropolitan Water District of Southern California Colorado River Aqueduct expansion program, they had in mind a machine that could handle and install 68-ton sections of pre-cast concrete pipe in trenches up to 50 feet deep and 125 feet wide at the top. The "Pipemobile" rolls into the pipe with its front wheel elevated, then "walks" onto that wheel, avoiding crushing the edge of the pipe. When it lifts the pipe, each of the six wheels, made by Kay-Brunner Steel Products, Inc., Los Angeles, carries about 25 tons. To make sure the machine could handle these tremendous loads without breakdowns, Kay-Brunner mounted two Timken® tapered roller bearings in each wheel hub for adjustability and rigidity.

The full-line contact of Timken bearings gives them extra load-carrying capacity. Their precision manufacture from the finest bearing-quality alloy steel available enables them to stand up to enormous shocks. And because they're tapered, they can take all the loads—radial and axial and all combinations—of the "Pipemobile".

AT YOUR DRAWING BOARD. To make the most profitable use of bearing engineering—at your design stage—be sure your Timken bearing sales engineer is on hand.



GREATER CAPACITY at less cost is the goal of Timken Company research and testing. Equipment like the dynamometer above, helps turn these dreams into reality.

Industry rolls on

TIMKEN®

tapered roller bearings

The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO." *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.* Canadian Division: Canadian Timken, St. Thomas, Ont.